Weston Solutions, Inc.
Suite 201
1090 King Georges Post Road
Edison, New Jersey 08837-3703
732-585-4400 • Fax: 732-225-7037
www.westonsolutions.com

The Trusted Integrator for Sustainable Solutions

REMOVAL SUPPORT TEAM 3
EPA CONTRACT EP-S2-14-01

August 24, 2015

Mr. Keith Glenn, On-Scene Coordinator
U.S. Environmental Protection Agency, Region II
Removal Action Branch
2890 Woodbridge Avenue
Edison, New Jersey 08837

EPA CONTRACT No.: EP-S2-14-01
TDD No.: TO-0006-0082
DOCUMENT CONTROL No.: RST3-02-D-0057
SUBJECT: SITE-SPECIFIC UFP QUALITY ASSURANCE PROJECT PLAN - NIAGARA TOWN GARAGE SITE, NIAGARA, NIAGARA COUNTY, NEW YORK

Dear Mr. Glenn,

Enclosed please find the Weston Solutions, Inc., Removal Support Team 3 Site-Specific Uniform Federal Policy Quality Assurance Project Plan for the soil sampling activities to be conducted at the Niagara Town Garage Site located in Niagara, Niagara County, New York beginning on August 25, 2015. If you have any questions or comments, please do not hesitate to contact me at (603) 512-4350.

Sincerely,

WESTON SOLUTIONS, INC.

For Peter Lisichenko
RST 3 Site Project Manager/Group Leader

Enclosure

cc: TDD File No.: TO-0006-0082

SITE-SPECIFIC UFP
QUALITY ASSURANCE PROJECT PLAN

NIAGARA TOWN GARAGE SITE
Niagara, Niagara County, New York

Prepared By:

Removal Support Team 3
Weston Solutions, Inc.
Engineering, Science, and Technology Division
Edison, New Jersey

DC No.: RST3-02-D-0057
TDD No.: TO-0006-0082
EPA Contract No.: EP-S2-14-01

August 2015

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ATTACHMENT B: EPA ERT Sampling SOPs

- ERT SOP No. 2001 - General Field Sampling Guidelines
- ERT SOP No. 2006 - Sampling Equipment Decontamination
- ERT SOP No. 2012 - Soil Sampling

ATTACHMENT C: EPA Removal Management Levels

LIST OF ACRONYMS

ADR	Automated Data Review
ANSETS	Analytical Services Tracking System
AOC	Acknowledgment of Completion
ASTM	American Society for Testing and Materials
CEO	Chief Executive Officer
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLP	Contract Laboratory Program
CFM	Contract Financial Manager
CO	Contract Officer
COI	Conflict of Interest
COO	Chief Operations Officer
CRDL	Contract Required Detection Limit
CRTL	Core Response Team Leader
CRQL	Contract Required Quantitation Limit
CQLOSS	Corporate Quality Leadership and Operations Support Services
CWA	Clean Water Act
DCN	Document Control Number
DESA	Division of Environmental Science and Assessment
DI	Deionized Water
DPO	Deputy Project Officer
DQI	Data Quality Indicator
DQO	Data Quality Objective
EM	Equipment Manager
EDD	Electronic Data deliverable
ENVL	Environmental Unit Leader
EPA	Environmental Protection Agency
ERT	Environmental Response Team
FASTAC	Field and Analytical Services Teaming Advisory Committee
GC/ECD	Gas Chromatography/Electron Capture Detector
GC/MS	Gas Chromatography/Mass Spectrometry
HASP	Health and Safety Plan
HRS	Hazard Ranking System
HSO	Health and Safety Officer
ITM	Information Technology Manager
LEL	Lower Explosive Limit
MSA	Mine Safety Appliances
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration

LIST OF ACRONYMS (Concluded)

OSWER	Office of Solid Waste and Emergency Response
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, Sensitivity
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PIO	Public Information Officer
PM	Program Manager
PO	Project Officer
PRP	Potentially Responsible Party
PT	Proficiency Testing
QA	Quality Assurance
QAL	Quality Assurance Leader
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RC	Readiness Coordinator
RCRA	Resource Conservation and Recovery Act
RML	Removal Management Level
RPD	Relative Percent Difference
RSCC	Regional Sample Control Coordinator
RST	Removal Support Team
SARA	Superfund Amendments and Reauthorization Act
SEDD	Staged Electronic Data Deliverable
SOP	Standard Operating Practice
SOW	Statement of Work
SPM	Site Project Manager
START	Superfund Technical Assessment and Response Team
STR	Sampling Trip Report
TAL	Target Analyte List
TCL	Total Compound List
TDD	Technical Direction Document
TDL	Technical Direction Letter
TO	Task Order
TQM	Total Quality Management
TSCA	Toxic Substances Control Act
UFP	Uniform Federal Policy
VOA	Volatile Organic Analysis

CROSSWALK

The following table provides a "cross-walk" between the QAPP elements outlined in the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP Manual), the necessary information, and the location of the information within the text document and corresponding QAPP Worksheet. Any QAPP elements and required information that are not applicable to the project are circled.

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
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QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
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QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
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QAPP Worksheet #1: Title and Approval Page

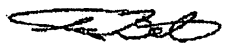
Title: Site-Specific UFP Quality Assurance Project Plan
Site Name/Project Name: Niagara Town Garage Site
Site Location: Niagara, Niagara County, New York
Revision Number: 00
Revision Date: Not Applicable

Weston Solutions, Inc.
Lead Organization

Karla Guerrero
Weston Solutions, Inc.
1090 King Georges Post Road, Suite 201
Edison, New Jersey 08837
Email: karla.guerrero@westonsolutions.com
Preparer's Name and Organizational Affiliation

24 August 2015
Preparation Date (Day/Month/Year)

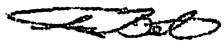
Site Project Manager:



For Signature

Peter Lisichenko/Weston Solutions, Inc.
Printed Name/Organization/Date

QA Officer/Technical Reviewer:



For Signature

Smita Sumbaly/Weston Solutions, Inc.
Printed Name/Organization/Date

EPA, Region II On-Scene Coordinator (OSC):

Signature

Keith Glenn/EPA, Region II
Printed Name/Organization/Date

EPA, Region II Quality Assurance Officer (QAO):

Signature

Printed Name/Organization/Date

Document Control Number: RST3-02-D-0057

QAPP Worksheet #2: QAPP Identifying Information

Site Name/Project Name: Niagara Town Garage Site
Site Location: Niagara, Niagara County, New York
Operable Unit: 00
Title: Site-Specific UFP Quality Assurance Project Plan
Revision Number: 00
Revision Date: Not Applicable

1. **Identify guidance used to prepare QAPP:** Uniform Federal Policy for Quality Assurance Project Plans. Refer to EPA ERT SOPs and EPA DESA analytical method.
2. **Identify regulatory program:** EPA, Region II
3. **Identify approval entity:** EPA, Region II
4. **Indicate whether the QAPP is a generic or a Site-specific QAPP.**
5. **List dates of scoping sessions that were held:** August 19, 2015
6. **List dates and titles of QAPP documents written for previous site work, if applicable:**

   None
7. **List organizational partners (stakeholders) and connection with lead organization:**

   None
8. **List data users:** EPA, Region II (see Worksheet #4 for individuals)
9. **If any required QAPP elements and required information are not applicable to the project, then provide an explanation for their exclusion below:** None
10. **Document Control Number:** RST3-02-D-0057

QAPP Worksheet #3: Distribution List

[List those entities to which copies of the approved QAPP, subsequent QAPP revisions, addenda, and amendments are sent]

QAPP Recipient	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Keith Glenn	On-Scene Coordinator	EPA, Region II	(732) 321-4454	(732) 906-6182	Glenn.Keith@epa.gov	RST3-02-D-0057
Peter Lisichenko	Site Project Manager	Weston Solutions, Inc., RST 3	(603) 512-4350	(732) 225-7037	Peter.Lisichenko@westonsolutions.com	RST3-02-D-0057
Smita Sumbaly	QA Officer	Weston Solutions, Inc., RST 3	(732) 585-4410	(732) 225-7037	S.Sumbaly@westonsolutions.com	RST3-02-D-0057
Timothy Benton	HSO	Weston Solutions, Inc., RST 3	(732) 585-4425	(732) 225-7037	Timothy.Benton@westonsolutions.com	RST3-02-D-0057
Site TDD File	RST 3 Site TDD File	Weston Solutions, Inc., RST 3	Not Applicable	Not Applicable	Not Applicable	-

QAPP Worksheet #4: Project Personnel Sign-Off Sheet

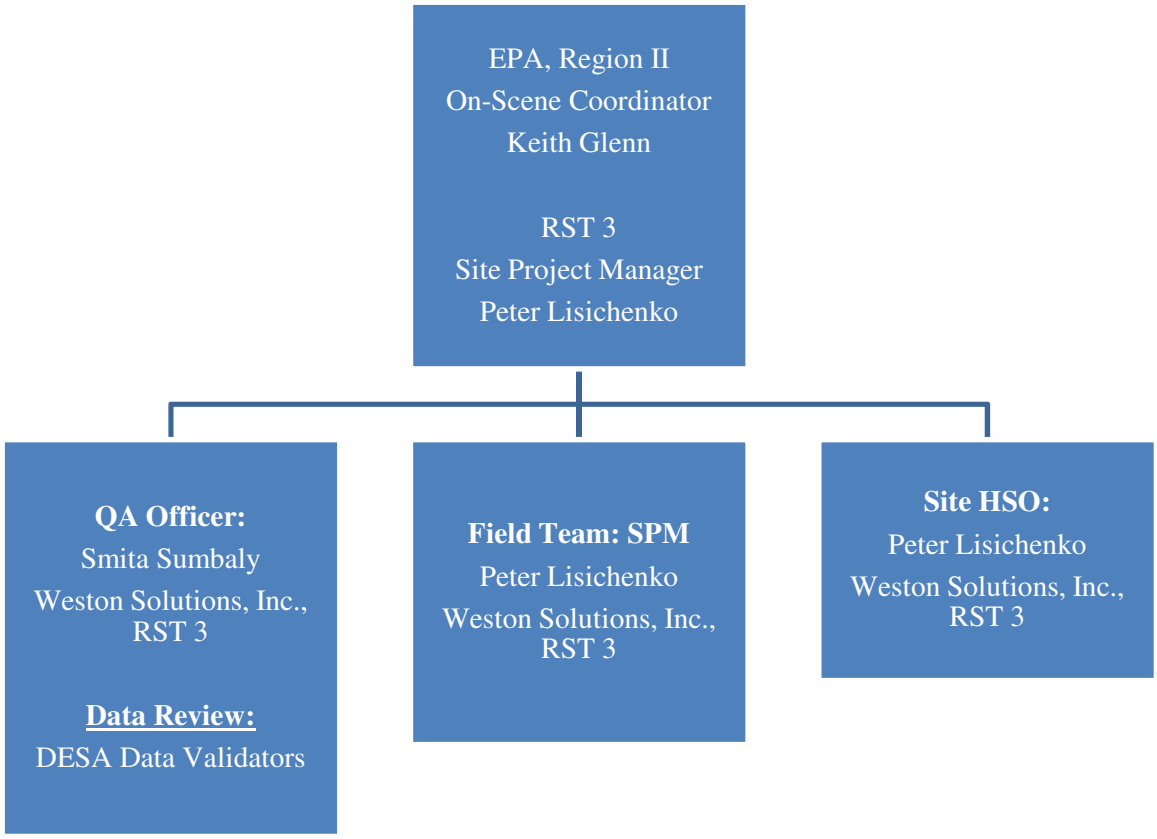
[Copies of this form signed by key project personnel from each organization to indicate that they have read the applicable sections of the QAPP and will perform the tasks as described; add additional sheets as required. Ask each organization to forward signed sheets to the central project file.]

Organization: Weston Solutions, Inc.

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Keith Glenn	EPA, Region II, On-Scene Coordinator	(732) 321-4454		8/25/15
Smita Sumbaly	QAO, RST 3	(732) 585-4410		
Timothy Benton	HSO, RST 3	(732) 585-4425		8/24/2015
Peter Lisichenko	RST 3 Field Personnel	(603) 512-4350		8/25/15

QAPP Worksheet #5: Project Organizational Chart

Identify reporting relationship between all organizations involved in the project, including the lead organization and all contractor and subcontractor organizations. Identify the organizations providing field sampling, on-site and off-site analysis, and data review services, including the names and telephone numbers of all project managers, project team members, and/or project contacts for each organization.



Acronyms:

EPA – U.S. Environmental Protection Agency
RST 3 – Removal Support Team 3
DESA – Division of Environmental Science and Assessment
HSO – Health & Safety Officer
OSC – On-Scene Coordinator
QA – Quality Assurance
SPM – Site Project Manager

QAPP Worksheet #6: Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Point of contact with EPA OSC	Site Project Manager, Weston Solutions, Inc., RST 3	Peter Lisichenko, SPM	(603) 512-4350	All technical, QA and decision-making matters in regard to the project (verbal, written or electronic)
Adjustments to QAPP	Site Project Manager, Weston Solutions, Inc., RST 3	Peter Lisichenko, SPM	(603) 512-4350	QAPP approval dialogue
Health and Safety On-Site Meeting	Site Project Manager, Weston Solutions, Inc., RST 3	Peter Lisichenko, SPM	(603) 512-4350	Explain/review site hazards, personnel protective equipment, hospital location, etc.

EPA: U.S. Environmental Protection Agency
OSC: On-Scene Coordinator
RST 3: Removal Support Team 3
SPM: Site Project Manager
QA: Quality Assurance
QAPP: Quality Assurance Project Plan

QAPP Worksheet #7: Personnel Responsibilities and Qualifications Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications*
Keith Glenn	EPA On-Scene Coordinator	EPA, Region II	All project coordination, direction and decision making.	NA
Peter Lisichenko	Field Personnel, RST 3	Weston Solutions, Inc.	Sample collection and management.	14 years*

*All RST 3 members, including subcontractor's resumes, are in possession of the RST 3 Program Manager, EPA Project Officer, and EPA Contracting Officer.

QAPP Worksheet #8: Special Personnel Training Requirements Table

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel / Groups Receiving Training	Personnel Titles / Organizational Affiliation	Location of Training Records / Certificates[1]
[Specify location of training records and certificates for samplers]						
QAPP Training	This training is presented to all RST 3 personnel to introduce the provisions, requirements, and responsibilities detailed in the UFP QAPP. The training presents the relationship between the site-specific QA Project Plans (QAPPs), SOPs, work plans, and the Generic QAPP. QAPP refresher training will be presented to all employees following a major QAPP revision.	Weston Solutions, Inc., QAO	As needed	All RST 3 field personnel upon initial employment and as refresher training	Weston Solutions, Inc.	Weston Solutions, Inc., EHS Database
Health and Safety Training	Health and safety training will be provided to ensure compliance with Occupational Safety and Health Administration (OSHA) as established in 29 CFR 1910.120.	Weston Solutions, Inc., HSO	Yearly at a minimum	All Employees upon initial employment and as refresher training every year	Weston Solutions, Inc.	Weston Solutions, Inc., EHS Database
Others	Scribe, ICS 100 and 200, and Air Monitoring Equipment Trainings provided to all employees	Weston Solutions, Inc., QAO/Group Leader's	Upon initial employment and as needed			
	Dangerous Goods Shipping	Weston Solutions, Inc., HSO	Every 2 years			

All team members are trained in the concepts and procedures in recognizing opportunities for continual improvement, and the approaches required to improve procedures while maintaining conformance with legal, technical, and contractual obligations.

[1] All RST 3 members, including subcontractor's, certifications are in possession of RST 3 HSO.

QAPP Worksheet #9: Project Scoping Session Participants Sheet

Site Name/Project Name: Niagara Town Garage Site
Site Location: Niagara, Niagara County, New York
Operable Unit: 00
Date of Session: August 19, 2015
Scoping Session Purpose: To discuss questions, comments, and assumptions regarding technical issues involved with the sampling activities.

Name	Title	Affiliation	Phone #	E-mail Address	*Project Role
Keith Glenn	EPA OSC	EPA, Region II	(732) 321-4454	Glenn.Keith@epa.gov	OSC
Timothy Benton	HSO	Weston Solutions, Inc., RST 3	(732) 585-4425	Timothy.Benton@westonsolutions.com	QA
Peter Lisichenko	Site Project Manager	Weston Solutions, Inc., RST 3	(603) 512-4350	Peter.lisichenko@westonsolutions.com	SPM & HSO

Comments/Decisions: As part of the U.S. Environmental Protection Agency (EPA) Removal Assessment of the Niagara Town Garage Site (the Site), Weston Solutions, Inc., Removal Support Team 3 (RST 3) is tasked with the collection of up to 20 soil samples, including quality assurance/quality control (QA/QC) samples, from locations identified by the EPA On-Scene Coordinator (OSC) throughout the Site utilizing Level D personal protective equipment (PPE). All soil samples will be collected from the 0 to 6 inch depth interval in accordance with EPA Environmental Response Team (ERT) Standard Operating Procedure (SOP) # 2012 and submitted to the EPA Division of Environmental Science and Assessment (DESA) laboratory for target compound list (TCL) pesticide analysis. All sample locations will be documented via photographs and global positioning system (GPS) technology.

Action Items: The Contract Laboratory Program (CLP) Analytical Request Form was submitted on August 20, 2015.

Consensus Decisions: Field activities are scheduled to begin on August 25, 2015 and will be completed in approximately one day.

QAPP Worksheet #10: Problem Definition

PROBLEM DEFINITION

The soil sampling to be conducted as part of the EPA Removal Assessment at the Site is scheduled to begin on August 25, 2015. As part of the Removal Assessment sampling event, RST 3 is tasked with the collection of 20 soil samples, including QA/QC samples, from locations identified by the EPA OSC throughout the Site. The analytical data from this investigation will be used to assist the EPA in determining the nature and extent of contaminated soil at the Site.

SITE HISTORY/CONDITIONS

The Site is located at 7105 Lockport Road in the Town of Niagara, Niagara County, New York. The active facility houses a Highway Garage Building, approximately 21,675 square feet (ft^2) in size, primarily used for storing and maintaining large equipment and vehicles for highway, police, water, and sewer authorities. A dirt fenced-in lot, measuring approximately 1 acre, is located at the rear of the property behind the Highway Garage Building. This area is used for the storage of materials including derelict vehicles, active vehicles, stone, excess pipe, and general mechanical debris. To the east of the Highway Garage Building is a storage silo for road salt and a yard that holds sand, dirt, and stone for highway purposes. To the west is the Niagara Town Hall and water tower, beyond which is a residential property. The Site is bounded to the south by an active railroad line, beyond which a public playground and residential properties are located. Surface drainage is to the south where it runs alongside the elevated railroad track.

The Site is bisected by two parcels, both owned by the City of Niagara, New York. Parcel 131.19-1-17 is the western parcel and most associated with the Site. This parcel also houses the Niagara Town Hall and the water tower. A majority of the contaminated material was found on this parcel. The western parcel, 131.20-1-1, holds the silo, dirt storage area and part of the garage structure that is used by the police department and water and sewer authorities.

PROJECT DESCRIPTION

RST 3 has been tasked with the collection of up to 20 soil samples, including QA/QC samples, from locations identified by the EPA OSC throughout the Site. Samples will be collected from the 0 to 6 inch depth interval and will be submitted to the EPA DESA laboratory for TCL pesticide analysis. On-site work is scheduled to begin on August 25, 2015 and is expected to be one day in duration.

OBSERVATION FROM ANY SITE RECONNAISSANCE REPORT

None at this time.

PROJECT DECISION STATEMENTS

EPA will use the analytical data to assist in determining the nature and extent of contaminated soil at the Site. If it is found that the on-site soil has been impacted then a determination of whether or not the Site warrants a Removal Action will be made by the EPA.

QAPP Worksheet #11: Project Quality Objectives/Systematic Planning Process Statement

Overall project objectives include: Sampling will be conducted by RST 3 to determine the presence of elevated concentrations of pesticides on the Site.

Who will use the data? Data will be used by the EPA, Region II OSC.

What will the data be used for? The analytical data from this investigation will be used to assist the EPA in determining the nature and extent of pesticide contamination and whether the soil on the Site contains elevated concentrations warranting a Removal Action.

What types of data are needed?

Matrix:	Soil
Type of Data:	Definitive Data
Analytical Techniques:	Off-Site laboratory analyses
Parameters:	TCL Pesticides
Type of sampling equipment:	Plastic spatulas and scoops, ziplock bags, and sample jars
Access Agreement:	Obtained by EPA, Region II OSC
Sampling locations:	Soil sampling locations will be determined based upon observations made by the EPA OSC and RST 3 field team.

How much data are needed? Up to 20 soil samples are anticipated to be collected from sample locations identified by the EPA OSC throughout the Site. The samples collected will be submitted for TCL pesticide analysis.

How "good" does the data need to be in order to support the environmental decision? Sampling/analytical measurement performance criteria for Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC) parameters will be established. Refer to Worksheet #12, criteria for performance measurement for definitive data.

Where, when, and how should the data be collected/generated? Surface soil sampling locations will be determined by visual inspection conducted by the EPA OSC and RST 3 field staff. All samples will be collected using methods outlined in the EPA ERT SOPs. The sampling event is tentatively scheduled to begin on August 25, 2015.

Who will collect and generate the data? The soil samples will be collected by RST 3. Samples will be analyzed for TCL pesticides by the EPA DESA laboratory and validated by a DESA data validator.

How will the data be reported? All data will be reported by the assigned laboratory (Preliminary, Electronic, and Hard Copy format). The RST 3 Site Project Manager will provide a Sampling Trip Report, Status Reports, Maps/Figures, Analytical Report, and Data Validation Report to the EPA OSC.

How will the data be archived? Electronic data deliverables (EDDs) will be archived in a Scribe database.

QAPP Worksheet #12: Measurement Performance Criteria Table

(UFP-QAPP Manual Section 2.6.2)
Complete this worksheet for each matrix, analytical group, and concentration level. Identify the data quality indicators (DQI), measurement performance criteria (MPC) and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems. Use additional worksheets if necessary. If MPC for specific DQI vary within an analytical parameter, i.e., MPC are analyte-specific, then provide analyte-specific MPC on an additional worksheet.

Matrix	Soil
Analytical Group	TCL Pesticides
Concentration Level	Low/Medium (µg/kg)

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
EPA ERT SOPs 2001 and 2012	C-91 (Ref: EPA 608)	Precision Accuracy	% RPD < 30 Average Recovery 50-150%	LCS Duplicate	A
		Accuracy	Compound Specific (full range: 30-150%)	Matrix spike	A
		Accuracy	Limits 30%-150%	Surrogate Compounds	A
		Accuracy	< RL	Method Blank	A

[1]Reference number from QAPP Worksheet #21.
[2]Reference number from QAPP Worksheet #23.

QAPP Worksheet #13: Secondary Data Criteria and Limitations Table

Any data needed for project implementation or decision making that are obtained from non-direct measurement sources such as computer databases, background information, technologies and methods, environmental indicator data, publications, photographs, topographical maps, literature files and historical data bases will be compared to the DQOs for the project to determine the acceptability of the data. Thus, for example, analytical data from historical surveys will be evaluated to determine whether they satisfy the validation criteria for the project and to determine whether sufficient data was provided to allow an appropriate validation to be done. If not, then a decision to conduct additional sampling for the site may be necessary.

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data May Be Used (if deemed usable during data assessment stage)	Limitations on Data Use
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

QAPP Worksheet #14: Summary of Project Tasks

Sampling Tasks:

As part of the Removal Assessment of the Site, RST 3 is tasked with the collection of up to 20 soil samples, including QA/QC samples, from locations identified by the EPA OSC throughout the Site. Samples will be collected from the 0 to 6 inch depth interval, in accordance with EPA ERT SOP # 2012 and submitted to the EPA DESA laboratory for TCL pesticide analysis.

Analysis Tasks:

Soil – TCL Pesticides – EPA DESA Method C-91

Quality Control Tasks:

The soil samples will be collected for definitive data QA objective. Field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a rate of one per 20 per sample matrix.

Data Management Tasks:

Activities under this project will be reported in status and trip reports and other deliverables (e.g., analytical reports, final reports) described herein. Activities will also be summarized in appropriate format for inclusion in monthly and annual reports.

The following deliverables will be provided under this project:

Trip Report: A trip report will be prepared to provide a detailed accounting of what occurred during each sampling mobilization. The trip report will be prepared within two weeks of the last day of each sampling mobilization. Information will be provided on time of major events, dates, and personnel on-site (including affiliations).

Maps/Figures: Maps depicting site layout, contaminant source areas, and sample locations will be included in the trip report, as appropriate.

Analytical Report: An analytical report will be prepared for samples analyzed under the plan. This is to be provided two weeks after receiving validated data. Information regarding the analytical methods or procedures employed, samples results, QA/QC results, chain-of-custody (COC) documentation, laboratory correspondence, and raw data will be provided within this deliverable.

Data Review: A review of the data generated under this plan will be undertaken. The assessment of data acceptability or usability will be provided separately, or as part of the analytical report.

QAPP Worksheet #14: Summary of Project Tasks (Continued)

Documentation and Records:

All sample documents will be completed legibly, in ink. Any corrections or revisions will be made by lining through the incorrect entry and by initialing the error.

Field Logbook: The field logbook is essentially a descriptive notebook detailing site activities and observations so that an accurate account of field procedures can be reconstructed in the writer's absence. Field logbook will be bound and paginated. All entries will be dated and signed by the individuals making the entries, and should include (at a minimum) the following

1. Site name and project number
2. Name(s) of personnel on-site
3. Dates and times of all entries (military time preferred)
4. Descriptions of all site activities, site entry and exit times
5. Noteworthy events and discussions
6. Weather conditions
7. Site observations
8. Sample and sample location identification and description*
9. Subcontractor information and names of on-site personnel
10. Date and time of sample collections, along with COC information
11. Record of photographs
12. Site sketches

* The description of the sample location will be noted in such a manner as to allow the reader to reproduce the location in the field at a later date.

Sample Labels: Sample labels will clearly identify the particular sample, and should include the following:

1. Site/project number.
2. Sample identification number.
3. Sample collection date and time.
4. Designation of sample (grab or composite).
5. Sample preservation.
6. Analytical parameters.
7. Name of sampler.

Sample labels will be written in indelible ink and securely affixed to the sample container. Tie-on labels can be used if properly secured.

Custody Seals: Custody seals demonstrate that a sample container has not been tampered with or opened. The individual in possession of the sample(s) will sign and date the seal, affixing it in such a manner that the container cannot be opened without breaking the seal. The name of this individual, along with a description of the sample packaging, will be noted in the field logbook.

QAPP Worksheet #14: Summary of Project Tasks (Concluded)

Assessment/Audit Tasks:

No performance audit of field operations is anticipated at this time. If conducted, performance and system audit will be in accordance with the project plan.

Data Review Tasks: All data will be validated by EPA DESA data validators.

Definitive data projects: The data generated under this QA/QC Sampling Plan will be evaluated according to guidance in the Uniform Federal Policy for Implementing Environmental Quality Systems: Evaluating, Assessing and Documenting Environmental Data Collection and Use Programs Part 1: UFP-QAPP (EPA-505-B-04-900A, March 2005); Part 2B: Quality Assurance/Quality Control Compendium: Minimum QA/QC Activities (EPA-505-B-04-900B, March 2005).

Laboratory analytical results will be assessed by the data reviewer for compliance with required precision, accuracy, completeness, representativeness, and sensitivity.

QAPP Worksheet #15: Reference Limits and Evaluation Table

Matrix: Soil
Analytical Group: TCL Pesticides
Concentration Level: Low/Medium

Analyte	CAS Number	Project Action Limits	Method QLs (µg/kg)	Achievable Laboratory (DESA) Limits	
				MDLs (µg/kg)	RLs (µg/kg)
alpha-BHC	319-89-6	NS	1.7	2.15	2.5
gamma-BHC	58-89-9	NS	1.7	1.89	2.5
beta-BHC	319-85-7	NS	1.7	1.35	2.5
delta-BHC	319-86-8	NS	1.7	1.51	2.5
HEPTACHLOR	76-44-8	NS	1.7	2.05	2.5
ALDRIN	309-00-2	NS	1.7	1.66	2.5
HEPTACHLOR EPOXIDE	1024-57-3	NS	1.7	1.34	2.5
gamma-CHLORDANE	5103-74-2	NS	1.7	0.96	2.5
alpha-CHLORDANE	5103-71-9	NS	1.7	1.01	2.5
ENDOSULFAN I	1031-07-8	NS	1.7	1.16	2.5
4,4'-DDE	72-55-9	NS	3.3	1.92	5.0
DIELDRIN	60-57-1	NS	3.3	1.91	5.0
ENDRIN	72-20-8	NS	3.3	1.84	5.0
4,4'-DDD	72-54-8	NS	3.3	1.35	5.0
ENDOSULFAN II	1031-078	NS	3.3	1.27	5.0
4,4'-DDT	50-29-3	NS	3.3	1.52	5.0
ENDRIN ALDEHYDE	7421-93-4	NS	3.3	2.24	5.0
METHOXYCHLOR	72-43-5	NS	17	8.00	25
ENDOSULFAN SULFATE	1031-07-8	NS	3.3	1.24	2.5
ENDRIN KETONE	53494-70-5	NS	3.3	1.18	2.5
TOXAPHENE	8001-35-2	NS	170	75.9	190
TECHNICAL CHLORDANE	--	NS	--	56.1	62

NS – Not Specified

QAPP Worksheet #16: Project Schedule/Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of QAPP	RST 3 Contractor SPM	Prior to sampling date	8/21/15	QAPP	8/24/15
Review of QAPP	RST 3 Contractor QAO and/or Group Leader	Prior to sampling date	8/24/15	Approved QAPP	8/24/15
Preparation of HASP	RST 3 Contractor SPM	Prior to sampling date	8/24/15	HASP	8/24/15
Procurement of Field Equipment	RST 3 Contractor SPM and/or Equipment Officer	Prior to sampling date	8/21/15	NA	--
Laboratory Request	Not Applicable	Prior to sampling date	8/21/15	Analytical Request Form	--
Field Reconnaissance/Access	RST 3 Contractor SPM; or EPA Region II OSC	8/25/15	8/25/15	NA	--
Collection of Field Samples	RST 3 Contractor SPM	8/25/15	8/25/15	NA	--
Laboratory Electronic Data Received	RST 3 Contractor	21 days from sampling date	9/15/15	Preliminary Data	9/15/15
Laboratory Package Received	RST 3 Contractor	42 days from sampling dates	9/15/15	--	9/15/15
Validation of Laboratory Results	RST 3 Contractor	42 days from sampling dates	10/6/15	Validation Report	10/6/15
Data Evaluation/ Preparation of Final Report	RST 3 Contractor SPM	2 weeks from validated data	10/20/15	Analytical Report	10/20/15

QAPP Worksheet #17: Sampling Design and Rationale

RST 3 is tasked with the collection of up to 20 soil samples from locations identified by the EPA OSC throughout the Site. Samples will be collected from the 0 to 6 inch depth interval in accordance with EPA ERT SOP # 2012, and submitted for TCL pesticide analyses. All sample locations will be documented via photographs and GPS technology.

Samples will be collected by first scraping the target interval sidewall with a dedicated plastic spatula (to expose a fresh soil surface), collecting the sample with a dedicated 2-ounce plastic sample scoop, and placing it in a polyethylene bag, where it can be homogenized prior to being placed in a sample jar. Fresh nitrile gloves will be donned for each sample collected. All soil sample information will be entered into a Scribe database for the generation of the chain of custody (COC) and sample labels.

All stainless-steel (non-dedicated) equipment, if used, during field sampling activities will be decontaminated in the field in accordance with EPA ERT SOP #2006 prior to and subsequent to sampling. Decontamination of sampling equipment will be conducted as follows:

1. Alconox/portable water scrub
2. Deionized water rinse
3. Solvent rinse
4. Deionized water rinse
5. Air Dry

This sampling design is based on information currently available and may be modified onsite in light of field-screening results and other acquired information.

The following laboratory will provide the analysis indicated:

Lab Name/Location	Sample Type	Parameters
EPA DESA Laboratory 2890 Woodbridge Ave. Bldg. 209, MS-230 Edison, NJ 08837 Tel.: (732) 906-6886	Soil	TCL Pesticides

.

Refer to Worksheet #20 for QA/QC samples, sampling methods, and SOPs.

QAPP Worksheet #18: Sampling Locations and Methods/SOP Requirements Table

Matrix	Sampling Location(s)	Units	Analytical Group(s)	Concentration Level	No. of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
Soil	Up to 20	µg/kg	TCL Pesticides	Low/Medium	1/20 duplicate sample per matrix	SOP# 2001, 2012	Determine contaminants

The website for EPA ERT SOPs is: http://www.ert.org/mainContent.asp?section=Products&subsection=List
µg/kg – micrograms per kilogram

QAPP Worksheet #19: Analytical SOP Requirements Table

Matrix	No. of Samples	Analytical Group [Lab Assignment]	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements	Maximum Holding Time (preparation/ analysis)
Soil	Up to 20	TCL Pesticides	Low/Medium	C-91 *(Ref: EPA 608)*	1 x 100g 1 x 100g (QC)	Glass, wide mouth	Cool, 4ºC	To extraction: 14 days;40 days to analysis

Note: Per the EPA DESA method, no additional sample volume will be collected for MS/MSD analysis.

QAPP Worksheet #20: Field Quality Control Sample Summary Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of Extra Volume Laboratory QC (e.g., MS/MSD) Samples[1]	No. of Rinsate Blanks[1]	No. of Trip. Blanks	No. of PE Samples
Soil	TCL Pesticide	Low/Medium	C-91 *(Ref: EPA 608)*	Up to 20	1/20 samples per matrix	1/20 samples per matrix	NR	NR	NR

[1] Only required if non-dedicated sampling equipment to be used.
NR – not required

QAPP Worksheet #21: Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
SOP#2001	General Field Sampling Guidelines (all media); Rev. 0.0 August 1994	EPA/OSWER/ERT	Site-Specific	N	--
SOP#2006	Sampling Equipment Decontamination; Rev 0.0 August 1994	EPA/OSWER/ERT	Site-Specific	N	--
SOP #2012	Soil Sampling from the Compendium of ERT Soil Sampling and Surface Geophysics Procedures.	EPA/OSWER/ERT	Stainless steel bowls, scoops, bucket augers, 8-oz. glass jars	N	--

Note: The website for EPA ERT SOPs is: www.ert.org/mainContent.asp?section=Products&subsection=List

QAPP Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Trimble® GeoXT™ handheld								

QAPP Worksheet #23: Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
C-91	Analysis of Pesticides and PCBs in Aqueous, Soil/Sediments and Waste Oil/Transformer Fluid Matrices, Rev 2.0, 3/07	Definite	Pesticides/PCBs	GC-ECD	DESA LAB	N

QAPP Worksheet #24: Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC-ECD	See SOP C-91	See SOP C-91	See SOP C-91	See SOP C-91	Assigned Lab personnel	SOP C-91

SOP – standard operating procedure

QAPP Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
See list of Instrument given in Worksheet #24	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19

[1] Specify the appropriate letter or number form the Analytical SOP References table (Worksheet #23)

QAPP Worksheet #26: Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): RST 3 Site Project Manager, Weston Solutions, Inc., Region II
Sample Packaging (Personnel/Organization): RST 3 Site Project Manager and sampling team members, Weston Solutions, Inc., Region II
Coordination of Shipment (Personnel/Organization): RST 3 Site Project Manager, sampling team members, Weston Solutions, Inc., Region II
Type of Shipment/Carrier: Hand Delivery
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): DESA Laboratory, Sample Custodian
Sample Custody and Storage (Personnel/Organization): DESA Laboratory, Sample Custodian
Sample Preparation (Personnel/Organization): DESA Laboratory, Sample Custodian
Sample Determinative Analysis (Personnel/Organization): DESA Laboratory, Sample Custodian
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be shipped same day of collection, and arrive at laboratory within 24 hours (1 day) of sample shipment
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical methodology; see Worksheet #19
SAMPLE DISPOSAL
Personnel/Organization: DESA Laboratory, Sample Custodian
Number of Days from Analysis: Until analysis and QA/QC checks are completed; as per analytical methodology; see Worksheet #19.

QAPP Worksheet #27: Sample Custody Requirements

Sample Identification Procedures: Each sample collected by Region II RST 3 will be designated by a code that will identify the site. The code will be a site-specific property number. The media type will follow the numeric code. A hyphen will separate the site code and media type. Specific media types are as follows: SS – Soil Sample

After the media type, the sequential sample numbers will be listed; duplicate samples will be identified in the same manner as other samples and will be distinguished and documented in the field logbook.

e.g. P0001-SS001-0006-001 Property P0001, Soil Sample Number 001, 0 to 6 Inches in Depth, First Sample From Location.

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): Each sample will be individually identified and labeled after collection, then sealed with custody seals and enclosed in a plastic cooler. The sample information will be recorded on COC forms, and will be either hand delivered or shipped to the appropriate laboratory via overnight delivery service or courier. Chain-of-custody records must be prepared in Scribe to accompany samples from the time of collection and throughout the shipping process. Each individual in possession of the samples must sign and date the sample COC Record. The chain-of-custody record will be considered completed upon receipt at the laboratory. A traffic report and chain-of-custody record will be maintained from the time the sample is taken to its final deposition. Every transfer of custody must be noted and signed for, and a copy of this record kept by each individual who has signed. When samples are not under direct control of the individual responsible for them, they must be stored in a locked container sealed with a custody seal. Specific information regarding custody of the samples projected to be collected on the weekend will be noted in the field logbook. The chain-of-custody record should include (at minimum) the following: 1) Sample identification number; 2) Sample information; 3) Sample location; 4) Sample date; 5) Sample Time; 6) Sample Type Matrix; 7) Sample Container Type; 8) Sample Analysis Requested; 9) Name(s) and signature(s) of sampler(s); and 10) Signature(s) of any individual(s) with custody of samples.

For this event each parcel will have its own chain-of custody. A separate chain-of-custody form must accompany each cooler for each daily shipment The chain-of-custody form must address all samples in that cooler, but not address samples in any other cooler. This practice maintains the chain-of-custody for all samples in case of mis-shipment.

Laboratory Sample Custody Procedures (receipt of samples, archiving, and disposal): A sample custodian at the laboratory will accept custody of the shipped samples, and check them for discrepancies, proper preservation, integrity, etc. If noted, issues will be forwarded to the laboratory manager for corrective action. The sample custodian will relinquish custody to the appropriate department for analysis. At this time, no samples will be archived at the laboratory. Disposal of the samples will occur only after analyses and QA/QC checks are completed.

QAPP Worksheet #28: QC Samples Table

(UFP-QAPP Manual Section 3.4)
Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limit exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

Matrix	Soil
Analytical Group	TCL Pesticides
Concentration Level	Low/Medium
Sampling SOP	EPA ERT #2012
Analytical Method/ SOP Reference	C-91 (Ref: EPA 608)
Sampler's Name	RST 3
Field Sampling Organization	Weston Solutions, Inc.
Analytical Organization	DESA Laboratory
No. of Sample Locations	20

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Instrument Performance (PEM)	Beginning of each analytical run	Total breakdown <30%	Check Instrument	Lab personnel	Sensitivity Contamination	Total breakdown <30%
Initial Calibration	C-91 (Ref: EPA 608)	% RSD +/- 25% Not more than 10% of total analytes failure RSD not more than 30%	Check Instrument, Reanalyze	Lab personnel	Accuracy/ Precision	% RSD +/- 25% Not more than 10% of total analytes failure RSD not more than 30%
Continuing Calibration Check Standard (Alternate check standard)	Beginning and the end of each analytical run	Max %D RRF +/- 25%	Reanalyze, Qualify data	Lab personnel	Accuracy	Max %D RRF +/- 25%
Method Blank	1 per extraction batch	< RL	Investigate source of contamination	Lab personnel	Sensitivity Contamination	< RL
LCS/LFB	2 per extraction batch	Limits: Average Recovery 50-150% % RPD < 30	Qualify data unless high recovery and/or Not Detected)	Lab personnel	Accuracy/ Precision	Limits: Average Recovery 50-150% % RPD < 30
Laboratory Matrix spikes	1 per extraction batch	Limits 30-150%	Qualify data unless high recovery and/or Not Detected)	Lab personnel	Accuracy	Limits 30-150%
Surrogates	Each sample, standard, blank	Limits 30%-150%	Reinject, Qualify data	Lab personnel	Extraction efficiency, Accuracy	Limits 30%-150%

QAPP Worksheet #29: Project Documents and Records Table

Sample Collection Documents and Records	Analysis Documents and Records	Data Assessment Documents and Records	Other
• Field logbooks • COC forms • Field Data Sheets • Photo-document	• Sample receipt logs • Internal and external COC forms • Equipment calibration logs • Sample preparation worksheets/logs • Sample analysis worksheets/run logs • Telephone/email logs • Corrective action documentation	• Data validation reports • Field inspection checklist(s) • Review forms for electronic entry of data into database • Corrective action documentation	CLP Request Form

QAPP Worksheet #30: Analytical Services Table

Matrix	Analytical Group	Concentration Level	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Soil	TCL Pesticides	Low/Medium	C-91 (Ref: EPA 608)	21 days preliminary	DESA Laboratory	NA

NA – not applicable
SOP – standard operating procedure

QAPP Worksheet #31: Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of Corrective Actions (Title and Organizational Affiliation)
PT	Semiannually	External	NELAC	PT provider	Lab Personnel	Lab Personnel	Lab QA Officer
NELAC	Every two years	External	NELAC	Florida DOH	Lab QA Officer	Lab Personnel	Florida DOH
INTERNAL AUDIT	Monthly	Internally	DESA Lab	Lab QA Officer	Lab Personnel	Lab Personnel	Lab QA Officer

QAPP Worksheet #32: Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Proficiency Testing (PT)	Letter with PT failure indicated	Lab QA Officer	30 days after the audit	Investigate the reason for the PT failure	Lab QA Officer	45 days after the CA report
NELAC	Audit Report with Non-conformance to QAPP, SOPs, NELAC+LQMP	Lab Management	30 days after the audit	Investigate and have a corrective action plan for the deficiencies	Florida DOH	30 days after receiving notification
INTERNAL	Audit Report with Non-conformance to QAPP, SOPs, NELAC Regulations	Lab Management	30 days after the audit	Investigate and have a corrective action plan for the deficiencies	Lab QA Officer	45 days after the CA report

QAPP Worksheet #33: QA Management Reports Table

Type of Report	Frequency (Daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
EPA DESA Laboratory (preliminary)	As performed	2 weeks from the sampling date	EPA DESA Laboratory	EPA DESA Laboratory, RST 3 SPM, Weston Solutions, Inc., and OSC, EPA Region II
EPA DESA Laboratory (validated)	As performed	Up to 21 days after receipt of preliminary data	DESA Data Validator	RST 3 SPM, Weston Solutions, Inc., and OSC, EPA Region II
On-Site Field Inspection	As performed	7 calendar days after completion of the inspection	RST 3 HSO	RST 3 SPM, Weston Solutions, Inc.
Field Change Request	As required per field change	3 days after identification of need for field change	RST 3 SPM	EPA OSC
Final Report	As performed	2 weeks after receipt of EPA approval of data package	RST 3 SPM	EPA OSC

QAPP Worksheet #34: Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Chain of Custody	Chain-of-custody forms will be verified against the sample cooler they represent. Sample Acceptance Checklist is completed. The OSCAR staff supervisor utilizes the analyses request information and the external COC to review the accuracy and completeness of LIMS log-in entries, as reflected on the LIMS Sample Receipt Form Details can be found in Laboratory Quality Management Plan, SOP G-25	Internal	OSCAR Personnel, DESA LAB
Analytical data package/ Final Report	The procedures for data review : 1- Data reduction/review by Primary Analyst. 2- Review complete data package (raw data) by independent Peer Reviewer 3- The Sample Project Coordinator reviews the project documentation for completeness followed by a QA review by the QAO 4- Final review by Branch Chief/Section Chief prior to release, this review is to ensure completeness and general compliance with the objectives of the project. This final review typically does not include a review of raw data. Details can be found in Laboratory Quality Management Plan.	Internal	Primary Analyst, Peer Reviewer, Sample Project Coordinator, Quality Assurance Officer, Section Chief/ Branch Chief. DESA LAB

QAPP Worksheet #35: Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
	Chain of Custody	Chain-of-custody forms will be verified against the sample cooler they represent. Sample Acceptance Checklist is completed. The OSCAR staff supervisor utilizes the analyses request information and the external COC to review the accuracy and completeness of LIMS log-in entries, as reflected on the LIMS Sample Receipt Form Details can be found in Laboratory Quality Management Plan, SOP G-25	OSCAR Personnel DESA LAB
	Analytical data package/ Final Report	The procedures for data review : 1- Data reduction/review by Primary Analyst. 2- Review complete data package (raw data) by independent Peer Reviewer 3- The Sample Project Coordinator reviews the project documentation for completeness followed by a QA review by the QAO 4- Final review by Branch Chief/Section Chief prior to release, this review is to ensure completeness and general compliance with the objectives of the project. This final review typically does not include a review of raw data. Details can be found in Laboratory Quality Management Plan.	Primary Analyst, Peer Reviewer, Sample Project Coordinator, Quality Assurance Officer, Section Chief/ Branch Chief. DESA LAB

QAPP Worksheet #36: Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa / IIb	Soil	TCL Pesticides	Low/Medium	DESA Validation Criteria	EPA DESA Data Validation Personnel

QAPP Worksheet #37: Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used: Data, whether generated in the field or by the laboratory, are tabulated and reviewed for Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCCS) by the SPM for field data or the data validator for laboratory data. The review of the PARCC DQIs will compare with the DQO detailed in the Final Site-Specific QAPP, the analytical methods used and impact of any qualitative and quantitative trends will be examined to determine if bias exists. A hard copy of field data is maintained in a designated field or site logbook. Laboratory data packages are validated, and final data reports are generated. All documents and logbooks are assigned unique and specific control numbers to allow tracking and management. Questions about Non-CLP data, as observed during the data review process, are resolved by contacting the respective site personnel and laboratories as appropriate for resolution. All communications are documented in the data validation record with comments as to the resolution to the observed deficiencies.

Where applicable, the following documents will be followed to evaluate data for fitness in decision making: EPA QA/G-4, *Guidance on Systematic Planning using the Data Quality Objectives Process,* EPA/240/B-06/001, February 2006, and EPA QA/G-9R, *Guidance for Data Quality Assessment*, A reviewer's Guide EPA/240/B-06/002, February 2006.

Describe the evaluative procedures used to assess overall measurement error associated with the project:
As delineated in the ***Uniform Federal Policy for Implementing Environmental Quality Systems: Evaluating, Assessing and Documenting Environmental Data Collection and Use Programs Part 1: UFP-QAPP (EPA-505-B-04-900A, March 2005); Part 2A: UFP-QAPP Workbook (EPA-505-B-04-900C, March 2005); Part 2B: Quality Assurance/Quality Control Compendium: Non-Time Critical QA/QC Activities (EPA-505-B-04-900B, March 2005);*** "Graded Approach" will be implemented for data collection activities that are either exploratory or where specific decisions cannot be identified, since this guidance indicates that the formal DQO process is not necessary.

The data will be evaluated to determine whether the Removal Action is required for the off-site residential properties. The validation process determines if the data satisfy the QA criteria. After the data pass the data validation process, comparison results with the PQO is done.

QAPP Worksheet #37: Usability Assessment (Concluded)

EPA will use the analytical data to assist in determining the nature and extent of contaminated soil at the Site. If it is found that the on-site soil has been impacted then a determination of whether or not the Site warrants a Removal Action will be made by the EPA.

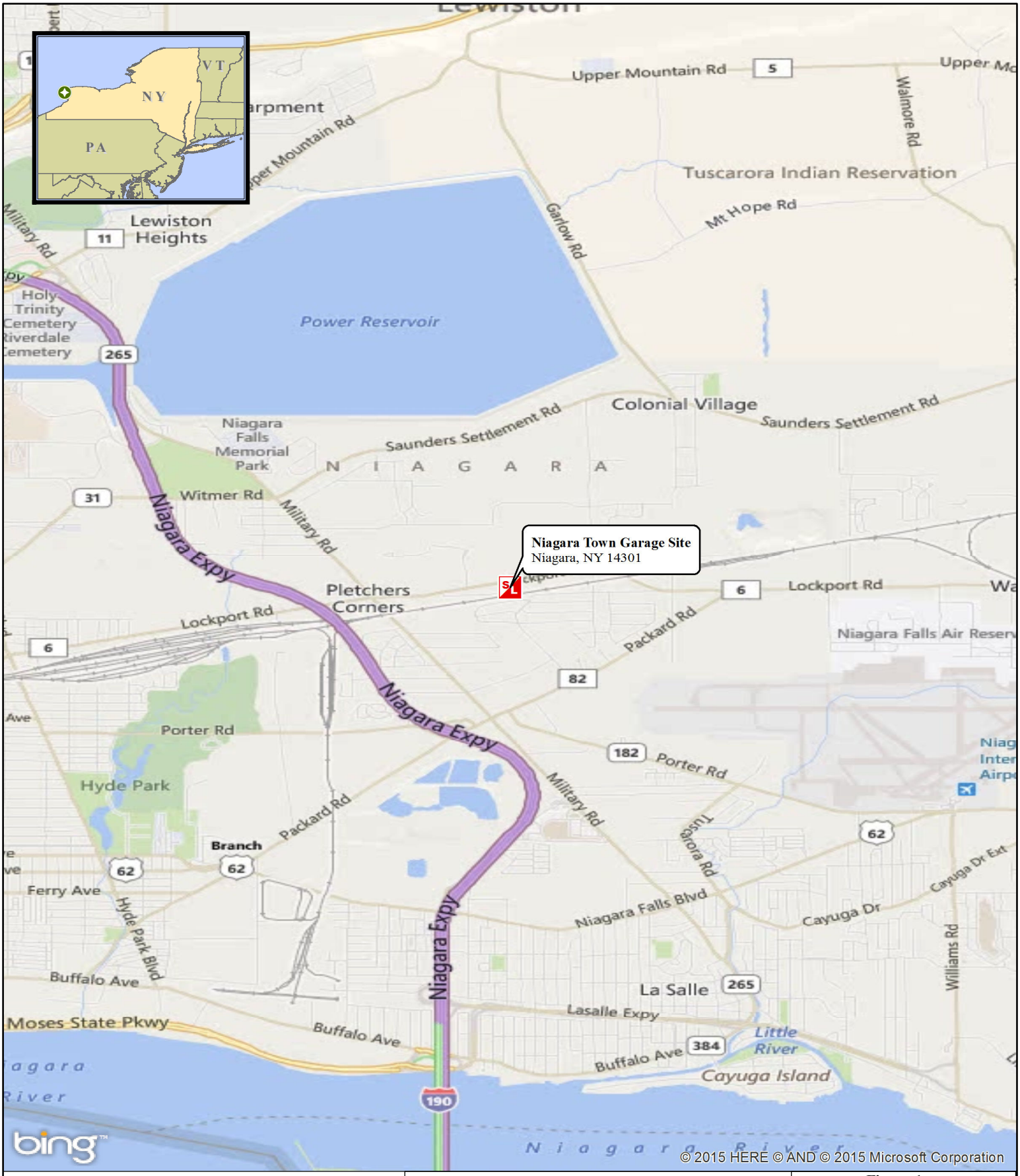
Identify the personnel responsible for performing the usability assessment: SPM, Data Validation Personnel, and EPA, Region II OSC

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

A copy of the most current approved QAPP, including any graphs, maps and text reports developed will be provided to all personnel identified on the distribution list.

ATTACHMENT A

Figure 1: Site Location Map



Legend

SL Site Location

N

0 0.3 0.6 1.2 1.8 2.4 Miles

Weston Solutions, Inc.
East Division

In Association With
Scientific and Environmental Associates, Inc.,
Environmental Compliance Consultants, Inc.,
Avatar Environmental, LLC, On-Site Environmental,
Inc.and Sovereign Consulting, Inc

Figure 1:
Site Location Map

Niagara Town Garage Site
Niagara, New York

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL SUPPORT TEAM 3
CONTRACT # EP-S2-14-01

DATE MODIFIED: 8/24/2015

GIS ANALYST:	T. Benton
EPA OSC:	K. Glenn
RST SPM:	P. Lisichenko
FILENAME:	150824_SITELOCATIONMAP.MXD

\\FSED2DATA1\GISDATA\RST_3\00060082\MXD\150824_SITELOCATIONMAP.MXD

ATTACHMENT B

Sampling SOPs

ERT SOP No. 2001 - General Field Sampling Guidelines
ERT SOP No. 2006 - Sampling Equipment Decontamination
ERT SOP No. 2012 - Soil Sampling

GENERAL FIELD SAMPLING GUIDELINES

SOP#: 2001
DATE: 08/11/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide general field sampling guidelines that will assist REAC personnel in choosing sampling strategies, location, and frequency for proper assessment of site characteristics. This SOP is applicable to all field activities that involve sampling.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

Sampling is the selection of a representative portion of a larger population, universe, or body. Through examination of a sample, the characteristics of the larger body from which the sample was drawn can be inferred. In this manner, sampling can be a valuable tool for determining the presence, type, and extent of contamination by hazardous substances in the environment.

The primary objective of all sampling activities is to characterize a hazardous waste site accurately so that its impact on human health and the environment can be properly evaluated. It is only through sampling and analysis that site hazards can be measured and the job of cleanup and restoration can be accomplished effectively with minimal risk. The sampling itself must be conducted so that every sample collected retains its original physical form and chemical composition. In this way, sample integrity is insured, quality assurance standards are maintained, and the sample can accurately represent the larger body of material under investigation.

The extent to which valid inferences can be drawn from a sample depends on the degree to which the sampling effort conforms to the project's objectives. For example, as few as one sample may produce adequate, technically valid data to address the project's objectives. Meeting the project's objectives requires thorough planning of sampling activities, and implementation of the most appropriate sampling and analytical procedures. These issues will be discussed in this procedure.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The amount of sample to be collected, and the proper sample container type (i.e., glass, plastic), chemical preservation, and storage requirements are dependent on the matrix being sampled and the parameter(s) of interest. Sample preservation, containers, handling, and storage for air and waste samples are discussed in the specific SOPs for air and waste sampling techniques.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

The nature of the object or materials being sampled may be a potential problem to the sampler. If a material is homogeneous, it will generally have a uniform composition throughout. In this case, any sample increment can be considered representative of the material. On the other hand, heterogeneous samples present problems to the sampler because of changes in the material over distance, both laterally and vertically.

Samples of hazardous materials may pose a safety threat to both field and laboratory personnel. Proper health and safety precautions should be implemented when handling this type of sample.

Environmental conditions, weather conditions, or non-target chemicals may cause problems and/or interferences when performing sampling activities or when sampling for a specific parameter. Refer to the specific SOPs for sampling techniques.

5.0 EQUIPMENT/APPARATUS

The equipment/apparatus required to collect samples must be determined on a site specific basis. Due to the wide variety of sampling equipment available, refer to the specific SOPs for sampling techniques which include lists of the equipment/apparatus required for sampling.

6.0 REAGENTS

Reagents may be utilized for preservation of samples and for decontamination of sampling equipment. The preservatives required are specified by the analysis to be performed. Decontamination solutions are specified in ERT SOP #2006, Sampling Equipment Decontamination.

7.0 PROCEDURE

7.1 Types of Samples

In relation to the media to be sampled, two basic types of samples can be considered: the environmental sample and the hazardous sample.

Environmental samples are those collected from streams, ponds, lakes, wells, and are off-site samples that are not expected to be contaminated with hazardous materials. They usually do not require the special handling procedures typically used for concentrated wastes. However, in certain instances, environmental samples can contain elevated concentrations of pollutants and in such cases would have to be handled as hazardous samples.

Hazardous or concentrated samples are those collected from drums, tanks, lagoons, pits, waste piles, fresh spills, or areas previously identified as contaminated, and require special handling procedures because of their potential toxicity or hazard. These samples can be further subdivided based on their degree of hazard; however, care should be taken when handling and shipping any wastes believed to be concentrated regardless of the degree.

The importance of making the distinction between environmental and hazardous samples is two-fold:

(1) Personnel safety requirements: Any sample thought to contain enough hazardous materials to pose a safety threat should be designated as hazardous and handled in a manner which ensures the safety of both field and laboratory personnel.

(2) Transportation requirements: Hazardous samples must be packaged, labeled, and shipped according to the International Air Transport Association (IATA) Dangerous Goods Regulations or Department of Transportation (DOT) regulations and U.S. EPA guidelines.

7.2 Sample Collection Techniques

In general, two basic types of sample collection techniques are recognized, both of which can be used for either environmental or hazardous samples.

Grab Samples

A grab sample is defined as a discrete aliquot representative of a specific location at a given point in time. The sample is collected all at once at one particular point in the sample medium. The representativeness of such samples is defined by the nature of the materials being sampled. In general, as sources vary over time and distance, the representativeness of grab samples will decrease.

Composite Samples

Composites are nondiscrete samples composed of more than one specific aliquot collected at various sampling locations and/or different points in time. Analysis of this type of sample produces an average value and can in certain instances be used as an alternative to analyzing a number of individual grab samples and calculating an average value. It should be noted, however, that compositing can mask problems by diluting isolated concentrations of some hazardous compounds below detection limits.

Compositing is often used for environmental samples and may be used for hazardous samples under certain conditions. For example, compositing of hazardous waste is often performed after compatibility tests have

been completed to determine an average value over a number of different locations (group of drums). This procedure generates data that can be useful by providing an average concentration within a number of units, can serve to keep analytical costs down, and can provide information useful to transporters and waste disposal operations.

For sampling situations involving hazardous wastes, grab sampling techniques are generally preferred because grab sampling minimizes the amount of time sampling personnel must be in contact with the wastes, reduces risks associated with compositing unknowns, and eliminates chemical changes that might occur due to compositing.

7.3 Types of Sampling Strategies

The number of samples that should be collected and analyzed depends on the objective of the investigation. There are three basic sampling strategies: random, systematic, and judgmental sampling.

Random sampling involves collection of samples in a nonsystematic fashion from the entire site or a specific portion of a site. Systematic sampling involves collection of samples based on a grid or a pattern which has been previously established. When judgmental sampling is performed, samples are collected only from the portion(s) of the site most likely to be contaminated. Often, a combination of these strategies is the best approach depending on the type of the suspected/known contamination, the uniformity and size of the site, the level/type of information desired, etc.

7.4 QA Work Plans (QAWP)

A QAWP is required when it becomes evident that a field investigation is necessary. It should be initiated in conjunction with, or immediately following, notification of the field investigation. This plan should be clear and concise and should detail the following basic components, with regard to sampling activities:

- Objective and purpose of the investigation.
- Basis upon which data will be evaluated.
- Information known about the site including location, type and size of the facility, and length of operations/abandonment.
- Type and volume of contaminated material, contaminants of concern (including concentration), and basis of the information/data.
- Technical approach including media/matrix to be sampled, sampling equipment to be used, sample equipment decontamination (if necessary), sampling design and rationale, and SOPs or description of the procedure to be implemented.
- Project management and reporting, schedule, project organization and responsibilities, manpower and cost projections, and required deliverables.
- QA objectives and protocols including tables summarizing field sampling and QA/QC analysis and objectives.

Note that this list of QAWP components is not all-inclusive and that additional elements may be added or altered depending on the specific requirements of the field investigation. It should also be recognized that although a detailed QAWP is quite important, it may be impractical in some instances. Emergency responses and accidental spills are prime examples of such instances where time might prohibit the development of site-specific QAWPs prior to field activities. In such cases, investigators would have to rely on general guidelines and personal judgment, and the sampling or response plans might simply be a strategy based on preliminary information and finalized on site. In any event, a plan of action should be developed, no matter how concise or informal, to aid investigators in maintaining a logical and consistent order to the implementation of their task.

7.5 Legal Implications

The data derived from sampling activities are often introduced as critical evidence during litigation of a hazardous waste site cleanup. Legal issues in which sampling data are important may include cleanup cost recovery, identification of pollution sources and responsible parties, and technical validation of remedial design methodologies. Because of the potential for involvement in legal actions, strict adherence to technical and administrative SOPs is essential during both the development and implementation of sampling activities.

Technically valid sampling begins with thorough planning and continues through the sample collection and analytical procedures. Administrative requirements involve thorough, accurate

documentation of all sampling activities. Documentation requirements include maintenance of a chain of custody, as well as accurate records of field activities and analytical instructions. Failure to observe these procedures fully and consistently may result in data that are questionable, invalid and non-defensible in court, and the consequent loss of enforcement proceedings.

8.0 CALCULATIONS

Refer to the specific SOPs for any calculations which are associated with sampling techniques.

9.0 QUALITY ASSURANCE/ QUALITY CONTROL

Refer to the specific SOPs for the type and frequency of QA/QC samples to be analyzed, the acceptance criteria for the QA/QC samples, and any other QA/QC activities which are associated with sampling techniques.

10.0 DATA VALIDATION

Refer to the specific SOPs for data validation activities that are associated with sampling techniques.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and corporate health and safety procedures.

SAMPLING EQUIPMENT DECONTAMINATION

SOP#: 2006
DATE: 08/11/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide a description of the methods used for preventing, minimizing, or limiting cross-contamination of samples due to inappropriate or inadequate equipment decontamination and to provide general guidelines for developing decontamination procedures for sampling equipment to be used during hazardous waste operations as per 29 Code of Federal Regulations (CFR) 1910.120. This SOP does not address personnel decontamination.

These are standard (i.e. typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitation, or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

Removing or neutralizing contaminants from equipment minimizes the likelihood of sample cross contamination, reduces or eliminates transfer of contaminants to clean areas, and prevents the mixing of incompatible substances.

Gross contamination can be removed by physical decontamination procedures. These abrasive and non-abrasive methods include the use of brushes, air and wet blasting, and high and low pressure water cleaning.

The first step, a soap and water wash, removes all visible particulate matter and residual oils and grease. This may be preceded by a steam or high pressure water wash to facilitate residuals removal. The second step involves a tap water rinse and a distilled/deionized water rinse to remove the detergent. An acid rinse provides a low pH media for trace metals removal and is included in the decontamination process if metal samples are to be collected. It is followed by another distilled/deionized water rinse. If sample analysis does not include metals, the acid rinse step can be omitted. Next, a high purity solvent rinse is performed for trace organics removal if organics are a concern at the site. Typical solvents used for removal of organic contaminants include acetone, hexane, or water. Acetone is typically chosen because it is an excellent solvent, miscible in water, and not a target analyte on the Priority Pollutant List. If acetone is known to be a contaminant of concern at a given site or if Target Compound List analysis (which includes acetone) is to be performed, another solvent may be substituted. The solvent must be allowed to evaporate completely and then a final distilled/deionized water rinse is performed. This rinse removes any residual traces of the solvent.

The decontamination procedure described above may be summarized as follows:

1. Physical removal
2. Non-phosphate detergent wash
3. Tap water rinse
4. Distilled/deionized water rinse
5. 10% nitric acid rinse
6. Distilled/deionized water rinse
7. Solvent rinse (pesticide grade)
8. Air dry
9. Distilled/deionized water rinse

If a particular contaminant fraction is not present at the site, the nine (9) step decontamination procedure specified above may be modified for site specificity. For example, the nitric acid rinse may be eliminated if metals are not of concern at a site. Similarly, the solvent rinse may be eliminated if organics are not of

concern at a site. Modifications to the standard procedure should be documented in the site specific work plan or subsequent report.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The amount of sample to be collected and the proper sample container type (i.e., glass, plastic), chemical preservation, and storage requirements are dependent on the matrix being sampled and the parameter(s) of interest.

More specifically, sample collection and analysis of decontamination waste may be required before beginning proper disposal of decontamination liquids and solids generated at a site. This should be determined prior to initiation of site activities.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

- The use of distilled/deionized water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment provided that it has been verified by laboratory analysis to be analyte free (specifically for the contaminants of concern).

- The use of an untreated potable water supply is not an acceptable substitute for tap water. Tap water may be used from any municipal or industrial water treatment system.

- If acids or solvents are utilized in decontamination they raise health and safety, and waste disposal concerns.

- Damage can be incurred by acid and solvent washing of complex and sophisticated sampling equipment.

5.0 EQUIPMENT/APPARATUS

Decontamination equipment, materials, and supplies are generally selected based on availability. Other considerations include the ease of decontaminating or disposing of the equipment. Most equipment and supplies can be easily procured. For example, soft-bristle scrub brushes or long-handled bottle brushes can be used to remove contaminants. Large galvanized wash tubs, stock tanks, or buckets can hold wash and rinse solutions. Children's wading pools can also be used. Large plastic garbage cans or other similar containers lined with plastic bags can help segregate contaminated equipment. Contaminated liquid can be stored temporarily in metal or plastic cans or drums.

The following standard materials and equipment are recommended for decontamination activities:

5.1 Decontamination Solutions

- Non-phosphate detergent
- Selected solvents (acetone, hexane, nitric acid, etc.)
- Tap water
- Distilled or deionized water

5.2 Decontamination Tools/Supplies

- Long and short handled brushes
- Bottle brushes
- Drop cloth/plastic sheeting
- Paper towels
- Plastic or galvanized tubs or buckets
- Pressurized sprayers (H_2O)
- Solvent sprayers
- Aluminum foil

5.3 Health and Safety Equipment

Appropriate personal protective equipment (i.e., safety glasses or splash shield, appropriate gloves, aprons or coveralls, respirator, emergency eye wash)

5.4 Waste Disposal

- Trash bags
- Trash containers
- 55-gallon drums
- Metal/plastic buckets/containers for storage and disposal of decontamination solutions

6.0 REAGENTS

There are no reagents used in this procedure aside from the actual decontamination solutions. Table 1 (Appendix A) lists solvent rinses which may be required for elimination of particular chemicals. In

general, the following solvents are typically utilized for decontamination purposes:

- 10% nitric acid is typically used for inorganic compounds such as metals. An acid rinse may not be required if inorganics are not a contaminant of concern.
- Acetone (pesticide grade)[(1)]
- Hexane (pesticide grade)[(1)]
- Methanol[(1)]

[(1)] - Only if sample is to be analyzed for organics.

7.0 PROCEDURES

As part of the health and safety plan, a decontamination plan should be developed and reviewed. The decontamination line should be set up before any personnel or equipment enter the areas of potential exposure. The equipment decontamination plan should include:

- The number, location, and layout of decontamination stations.
- Decontamination equipment needed.
- Appropriate decontamination methods.
- Methods for disposal of contaminated clothing, equipment, and solutions.
- Procedures can be established to minimize the potential for contamination. This may include: (1) work practices that minimize contact with potential contaminants; (2) using remote sampling techniques; (3) covering monitoring and sampling equipment with plastic, aluminum foil, or other protective material; (4) watering down dusty areas; (5) avoiding laying down equipment in areas of obvious contamination; and (6) use of disposable sampling equipment.

7.1 Decontamination Methods

All samples and equipment leaving the contaminated area of a site must be decontaminated to remove any contamination that may have adhered to equipment. Various decontamination methods will remove contaminants by: (1) flushing or other physical action, or (2) chemical complexing to inactivate contaminants by neutralization, chemical reaction, disinfection, or sterilization.

Physical decontamination techniques can be grouped into two categories: abrasive methods and non-abrasive methods, as follows:

7.1.1 Abrasive Cleaning Methods

Abrasive cleaning methods work by rubbing and wearing away the top layer of the surface containing the contaminant. The mechanical abrasive cleaning methods are most commonly used at hazardous waste sites. The following abrasive methods are available:

Mechanical

Mechanical methods of decontamination include using metal or nylon brushes. The amount and type of contaminants removed will vary with the hardness of bristles, length of time brushed, degree of brush contact, degree of contamination, nature of the surface being cleaned, and degree of contaminant adherence to the surface.

Air Blasting

Air blasting equipment uses compressed air to force abrasive material through a nozzle at high velocities. The distance between nozzle and surface cleaned, air pressure, time of application, and angle at which the abrasive strikes the surface will dictate cleaning efficiency. Disadvantages of this method are the inability to control the amount of material removed and the large amount of waste generated.

Wet Blasting

Wet blast cleaning involves use of a suspended fine abrasive. The abrasive/water mixture is delivered by compressed air to the contaminated area. By using a very fine abrasive, the amount of materials removed can be carefully controlled.

7.1.2 Non-Abrasive Cleaning Methods

Non-abrasive cleaning methods work by forcing the contaminant off a surface with pressure. In general, the equipment surface is not removed using non-abrasive methods.

Low-Pressure Water

This method consists of a container which is filled with water. The user pumps air out of the container to create a vacuum. A slender nozzle and hose allow the user to spray in hard-to-reach places.

High-Pressure Water

This method consists of a high-pressure pump, an operator controlled directional nozzle, and a high-pressure hose. Operating pressure usually ranges from 340 to 680 atmospheres (atm) and flow rates usually range from 20 to 140 liters per minute.

Ultra-High-Pressure Water

This system produces a water jet that is pressured from 1,000 to 4,000 atmospheres. This ultra-high-pressure spray can remove tightly-adhered surface films. The water velocity ranges from 500 meters/second (m/s) (1,000 atm) to 900 m/s (4,000 atm). Additives can be used to enhance the cleaning action.

Rinsing

Contaminants are removed by rinsing through dilution, physical attraction, and solubilization.

Damp Cloth Removal

In some instances, due to sensitive, non-waterproof equipment or due to the unlikelihood of equipment being contaminated, it is not necessary to conduct an extensive decontamination procedure. For example, air sampling pumps hooked on a fence, placed on a drum, or wrapped in plastic bags are not likely to become heavily contaminated. A damp cloth should be used to wipe off contaminants which may have adhered to equipment through airborne contaminants or from surfaces upon which the equipment was set.

Disinfection/Sterilization

Disinfectants are a practical means of inactivating infectious agents. Unfortunately, standard sterilization methods are impractical for large equipment. This method of decontamination is typically performed off-site.

7.2 Field Sampling Equipment Decontamination Procedures

The decontamination line is setup so that the first station is used to clean the most contaminated item. It progresses to the last station where the least contaminated item is cleaned. The spread of contaminants is further reduced by separating each decontamination station by a minimum of three (3) feet. Ideally, the contamination should decrease as the equipment progresses from one station to another farther along in the line.

A site is typically divided up into the following boundaries: Hot Zone or Exclusion Zone (EZ), the Contamination Reduction Zone (CRZ), and the Support or Safe Zone (SZ). The decontamination line should be setup in the Contamination Reduction Corridor (CRC) which is in the CRZ. Figure 1 (Appendix B) shows a typical contaminant reduction zone layout. The CRC controls access into and out of the exclusion zone and confines decontamination activities to a limited area. The CRC boundaries should be conspicuously marked. The far end is the hotline, the boundary between the exclusion zone and the contamination reduction zone. The size of the decontamination corridor depends on the number of stations in the decontamination process, overall dimensions of the work zones, and amount of space available at the site. Whenever possible, it should be a straight line.

Anyone in the CRC should be wearing the level of protection designated for the decontamination crew. Another corridor may be required for the entry and exit of heavy equipment. Sampling and monitoring equipment and sampling supplies are all maintained outside of the CRC. Personnel don their equipment away from the CRC and enter the exclusion zone through a separate access control point at the hotline. One person (or more) dedicated to decontaminating equipment is recommended.

7.2.1 Decontamination Setup

Starting with the most contaminated station, the decontamination setup should be as follows:

Station 1: Segregate Equipment Drop

Place plastic sheeting on the ground (Figure 2, Appendix B). Size will depend on amount of

equipment to be decontaminated. Provide containers lined with plastic if equipment is to be segregated. Segregation may be required if sensitive equipment or mildly contaminated equipment is used at the same time as equipment which is likely to be heavily contaminated.

Station 2: Physical Removal With A High-Pressure Washer (Optional)

As indicated in 7.1.2, a high-pressure wash may be required for compounds which are difficult to remove by washing with brushes. The elevated temperature of the water from the high-pressure washers is excellent at removing greasy/oily compounds. High pressure washers require water and electricity.

A decontamination pad may be required for the high-pressure wash area. An example of a wash pad may consist of an approximately 1 1/2 foot-deep basin lined with plastic sheeting and sloped to a sump at one corner. A layer of sand can be placed over the plastic and the basin is filled with gravel or shell. The sump is also lined with visqueen and a barrel is placed in the hole to prevent collapse. A sump pump is used to remove the water from the sump for transfer into a drum.

Typically heavy machinery is decontaminated at the end of the day unless site sampling requires that the machinery be decontaminated frequently. A separate decontamination pad may be required for heavy equipment.

Station 3: Physical Removal With Brushes And A Wash Basin

Prior to setting up Station 3, place plastic sheeting on the ground to cover areas under Station 3 through Station 10.
Fill a wash basin, a large bucket, or child's swimming pool with non-phosphate detergent and tap water. Several bottle and bristle brushes to physically remove contamination should be dedicated to this station . Approximately 10 - 50 gallons of water may be required initially depending upon the amount of equipment to decontaminate and the amount of gross contamination.

Station 4: Water Basin

Fill a wash basin, a large bucket, or child's swimming pool with tap water. Several bottle and bristle brushes should be dedicated to this station. Approximately 10-50 gallons of water may be required initially depending upon the amount of equipment to decontaminate and the amount of gross contamination.

Station 5: Low-Pressure Sprayers

Fill a low-pressure sprayer with distilled/deionized water. Provide a 5-gallon bucket or basin to contain the water during the rinsing process. Approximately 10-20 gallons of water may be required initially depending upon the amount of equipment to decontaminate and the amount of gross contamination.

Station 6: Nitric Acid Sprayers

Fill a spray bottle with 10% nitric acid. An acid rinse may not be required if inorganics are not a contaminant of concern. The amount of acid will depend on the amount of equipment to be decontaminated. Provide a 5-gallon bucket or basin to collect acid during the rinsing process.

Station 7: Low-Pressure Sprayers

Fill a low-pressure sprayer with distilled/deionized water. Provide a 5-gallon bucket or basin to collect water during the rinsate process.

Station 8: Organic Solvent Sprayers

Fill a spray bottle with an organic solvent. After each solvent rinse, the equipment should be rinsed with distilled/deionized water and air dried. Amount of solvent will depend on the amount of equipment to decontaminate. Provide a 5-gallon bucket or basin to collect the solvent during the rinsing process.

Solvent rinses may not be required unless organics are a contaminant of concern, and may be eliminated from the station sequence.

Station 9: Low-Pressure Sprayers

Fill a low-pressure sprayer with distilled/deionized water. Provide a 5-gallon bucket or basin to collect water during the rinsate process.

Station 10: Clean Equipment Drop

Lay a clean piece of plastic sheeting over the bottom

plastic layer. This will allow easy removal of the plastic in the event that it becomes dirty. Provide aluminum foil, plastic, or other protective material to wrap clean equipment.

7.2.2 Decontamination Procedures

Station 1: Segregate Equipment Drop

Deposit equipment used on-site (i.e., tools, sampling devices and containers, monitoring instruments radios, clipboards, etc.) on the plastic drop cloth/sheet or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross contamination. Loose leaf sampling data sheets or maps can be placed in plastic zip lock bags if contamination is evident.

Station 2: Physical Removal With A High-Pressure Washer (Optional)

Use high pressure wash on grossly contaminated equipment. Do not use high- pressure wash on sensitive or non-waterproof equipment.

Station 3: Physical Removal With Brushes And A Wash Basin

Scrub equipment with soap and water using bottle and bristle brushes. Only sensitive equipment (i.e., radios, air monitoring and sampling equipment) which is waterproof should be washed. Equipment which is not waterproof should have plastic bags removed and wiped down with a damp cloth. Acids and organic rinses may also ruin sensitive equipment. Consult the manufacturers for recommended decontamination solutions.

Station 4: Equipment Rinse

Wash soap off of equipment with water by immersing the equipment in the water while brushing. Repeat as many times as necessary.

Station 5: Low-Pressure Rinse

Rinse sampling equipment with distilled/deionized water with a low-pressure sprayer.

Station 6: Nitric Acid Sprayers (required only if metals are a contaminant of concern)

Using a spray bottle rinse sampling equipment with nitric acid. Begin spraying (inside and outside) at one end of the equipment allowing the acid to drip to the other end into a 5-gallon bucket. A rinsate blank may be required at this station. Refer to Section 9.

Station 7: Low-Pressure Sprayers

Rinse sampling equipment with distilled/deionized water with a low-pressure sprayer.

Station 8: Organic Solvent Sprayers

Rinse sampling equipment with a solvent. Begin spraying (inside and outside) at one end of the equipment allowing the solvent to drip to the other end into a 5-gallon bucket. Allow the solvent to evaporate from the equipment before going to the next station. A QC rinsate sample may be required at this station.

Station 9: Low-Pressure Sprayers

Rinse sampling equipment with distilled/deionized water with a low-pressure washer.

Station 10 : Clean Equipment Drop

Lay clean equipment on plastic sheeting. Once air dried, wrap sampling equipment with aluminum foil, plastic, or other protective material.

7.2.3 Post Decontamination Procedures

1. Collect high-pressure pad and heavy equipment decontamination area liquid and waste and store in appropriate drum or container. A sump pump can aid in the collection process. Refer to the Department of Transportation (DOT) requirements for appropriate containers based on the contaminant of concern.

2. Collect high-pressure pad and heavy equipment decontamination area solid waste and store in appropriate drum or container. Refer to the DOT requirements for appropriate containers based on the contaminant of concern.

3. Empty soap and water liquid wastes from basins and buckets and store in appropriate

drum or container. Refer to the DOT requirements for appropriate containers based on the contaminant of concern.

4. Empty acid rinse waste and place in appropriate container or neutralize with a base and place in appropriate drum. pH paper or an equivalent pH test is required for neutralization. Consult DOT requirements for appropriate drum for acid rinse waste.

5. Empty solvent rinse sprayer and solvent waste into an appropriate container. Consult DOT requirements for appropriate drum for solvent rinse waste.

6. Using low-pressure sprayers, rinse basins, and brushes. Place liquid generated from this process into the wash water rinse container.

7. Empty low-pressure sprayer water onto the ground.

8. Place all solid waste materials generated from the decontamination area (i.e., gloves and plastic sheeting, etc.) in an approved DOT drum. Refer to the DOT requirements for appropriate containers based on the contaminant of concern.

9. Write appropriate labels for waste and make arrangements for disposal. Consult DOT regulations for the appropriate label for each drum generated from the decontamination process.

8.0 CALCULATIONS

This section is not applicable to this SOP.

9.0 QUALITYASSURANCE/ QUALITY CONTROL

A rinsate blank is one specific type of quality control sample associated with the field decontamination process. This sample will provide information on the effectiveness of the decontamination process employed in the field.

Rinsate blanks are samples obtained by running analyte free water over decontaminated sampling equipment to test for residual contamination. The blank water is collected in sample containers for handling, shipment, and analysis. These samples are treated identical to samples collected that day. A rinsate blank is used to assess cross contamination brought about by improper decontamination procedures. Where dedicated sampling equipment is not utilized, collect one rinsate blank per day per type of sampling device samples to meet QA2 and QA3 objectives.

If sampling equipment requires the use of plastic tubing it should be disposed of as contaminated and replaced with clean tubing before additional sampling occurs.

10.0 DATA VALIDATION

Results of quality control samples will be evaluated for contamination. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow OSHA, U.S. EPA, corporate, and other applicable health and safety procedures.

Decontamination can pose hazards under certain circumstances. Hazardous substances may be incompatible with decontamination materials. For example, the decontamination solution may react with contaminants to produce heat, explosion, or toxic products. Also, vapors from decontamination solutions may pose a direct health hazard to workers by inhalation, contact, fire, or explosion.

The decontamination solutions must be determined to be acceptable before use. Decontamination materials may degrade protective clothing or equipment; some solvents can permeate protective clothing. If decontamination materials do pose a health hazard, measures should be taken to protect personnel or substitutions should be made to eliminate the hazard. The choice of respiratory protection based on contaminants of concern from the site may not be appropriate for solvents used in the decontamination process.

Safety considerations should be addressed when using abrasive and non-abrasive decontamination

equipment. Maximum air pressure produced by abrasive equipment could cause physical injury. Displaced material requires control mechanisms.

Material generated from decontamination activities requires proper handling, storage, and disposal. Personal Protective Equipment may be required for these activities.

Material safety data sheets are required for all decontamination solvents or solutions as required by the Hazard Communication Standard (i.e., acetone, alcohol, and trisodiumphosphate).

In some jurisdictions, phosphate containing detergents (i.e., TSP) are banned.

12.0 REFERENCES

Field Sampling Procedures Manual, New Jersey Department of Environmental Protection, February, 1988.

A Compendium of Superfund Field Operations Methods, EPA 540/p-87/001.

Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, USEPA Region IV, April 1, 1986.

Guidelines for the Selection of Chemical Protective Clothing, Volume 1, Third Edition, American Conference of Governmental Industrial Hygienists, Inc., February, 1987.

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH/OSHA/USCG/EPA, October, 1985.

APPENDIX A

Table

Table 1. Soluble Contaminants and Recommended Solvent Rinse

TABLE 1 Soluble Contaminants and Recommended Solvent Rinse		
SOLVENT[1]	EXAMPLES OF SOLVENTS	SOLUBLE CONTAMINANTS
Water	Deionized water Tap water	Low-chain hydrocarbons Inorganic compounds Salts Some organic acids and other polar compounds
Dilute Acids	Nitric acid Acetic acid Boric acid	Basic (caustic) compounds (e.g., amines and hydrazines)
Dilute Bases	Sodium bicarbonate (e.g., soap detergent)	Acidic compounds Phenol Thiols Some nitro and sulfonic compounds
Organic Solvents [2]	Alcohols Ethers Ketones Aromatics Straight chain alkalines (e.g., hexane) Common petroleum products (e.g., fuel, oil, kerosene)	Nonpolar compounds (e.g., some organic compounds)
Organic Solvent[2]	Hexane	PCBs

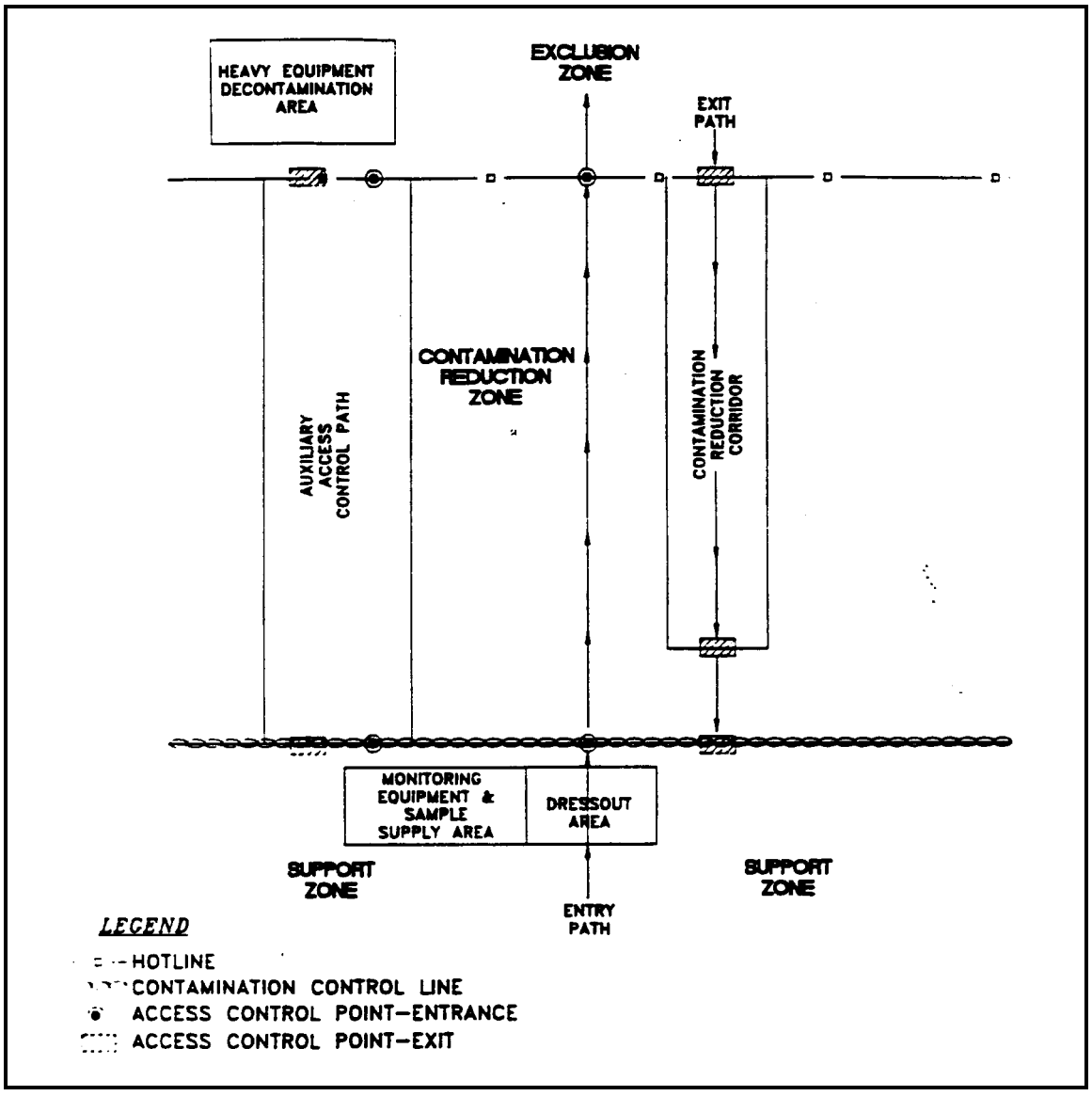
[1] - Material safety data sheets are required for all decontamination solvents or solutions as required by the Hazard Communication Standard

[2] - WARNING: Some organic solvents can permeate and/or degrade the protective clothing

APPENDIX B

Figures

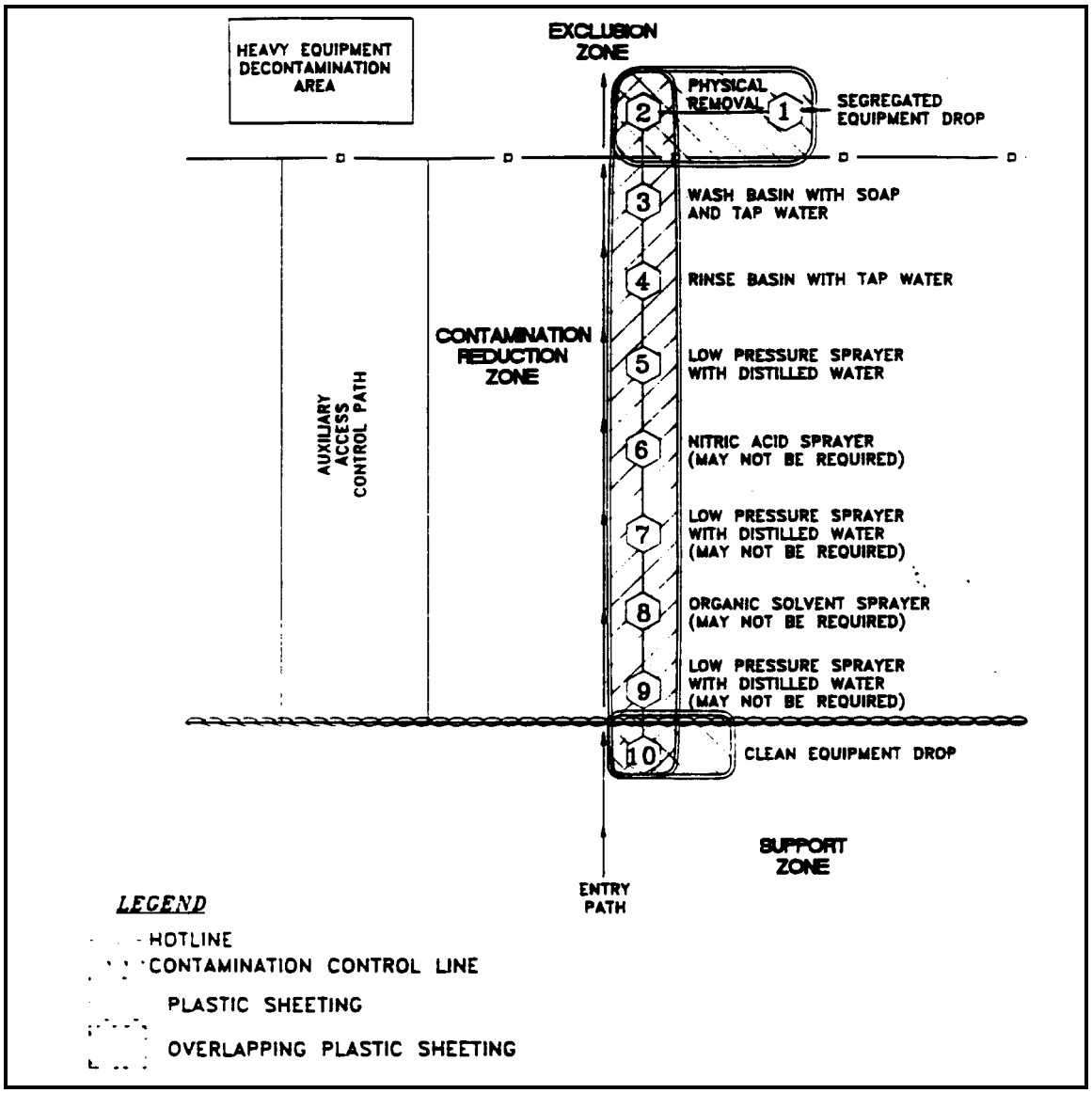
Figure 1. Contamination Reduction Zone Layout



APPENDIX B (Cont'd.)

Figures

Figure 2. Decontamination Layout



U. S. EPA ENVIRONMENTAL RESPONSE TEAM

STANDARD OPERATING PROCEDURES

SOIL SAMPLING

CONTENTS

SUPERCEDES: SOP #2012; Revision 0.0; 11/16/94; U.S. EPA Contract 68-C4-0022.

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to describe the procedures for the collection of representative soil samples. Sampling depths are assumed to be those that can be reached without the use of a drill rig, direct-push, or other mechanized equipment (except for a back-hoe). Analysis of soil samples may determine whether concentrations of specific pollutants exceed established action levels, or if the concentrations of pollutants present a risk to public health, welfare, or the environment.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the actual procedures used should be documented and described in an appropriate site report.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

Soil samples may be collected using a variety of methods and equipment depending on the depth of the desired sample, the type of sample required (disturbed vs. undisturbed), and the soil type. Near-surface soils may be easily sampled using a spade, trowel, and scoop. Sampling at greater depths may be performed using a hand auger, continuous flight auger, a trier, a split-spoon, or, if required, a backhoe.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Chemical preservation of solids is not generally recommended. Samples should, however, be cooled and protected from sunlight to minimize any potential reaction. The amount of sample to be collected and proper sample container type are discussed in ERT/REAC SOP #2003 Rev. 0.0 08/11/94, *Sample Storage, Preservation and Handling.*

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

There are two primary potential problems associated with soil sampling - cross contamination of samples and improper sample collection. Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Improper sample collection can involve using contaminated equipment, disturbance of the matrix resulting in compaction of the sample, or inadequate homogenization of the samples where required, resulting in variable, non-representative results.

5.0 EQUIPMENT

Soil sampling equipment includes the following:

- Maps/plot plan
- Safety equipment, as specified in the site-specific Health and Safety Plan
- Survey equipment or global positioning system (GPS) to locate sampling points
- Tape measure
- Survey stakes or flags
- Camera and film
- Stainless steel, plastic, or other appropriate homogenization bucket, bowl or pan
- Appropriate size sample containers
- Ziplock plastic bags
- Logbook
- Labels
- Chain of Custody records and custody seals
- Field data sheets and sample labels
- Cooler(s)
- Ice
- Vermiculite
- Decontamination supplies/equipment
- Canvas or plastic sheet
- Spade or shovel
- Spatula
- Scoop
- Plastic or stainless steel spoons
- Trowel(s)
- Continuous flight (screw) auger
- Bucket auger
- Post hole auger
- Extension rods
- T-handle
- Sampling trier
- Thin wall tube sampler
- Split spoons
- Vehimeyer soil sampler outfit
  - Tubes
  - Points
  - Drive head
  - Drop hammer
  - Puller jack and grip
- Backhoe

6.0 REAGENTS

Reagents are not used for the preservation of soil samples. Decontamination solutions are specified in ERT/REAC SOP #2006 Rev. 0.0 08/11/94, *Sampling Equipment Decontamination*, and the site specific work plan.

7.0 PROCEDURES

7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies required.

2. Obtain necessary sampling and monitoring equipment.

3. Decontaminate or pre-clean equipment, and ensure that it is in working order.

4. Prepare schedules and coordinate with staff, client, and regulatory agencies, if appropriate.

5. Perform a general site survey prior to site entry in accordance with the site specific Health and Safety Plan.

6. Use stakes, flagging, or buoys to identify and mark all sampling locations. Specific site factors, including extent and nature of contaminant, should be considered when selecting sample location. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. All staked locations should be utility-cleared by the property owner or the On-Scene-Coordinator (OSC) prior to soil sampling; and utility clearance should always be confirmed before beginning work.

7.2 Sample Collection

7.2.1 Surface Soil Samples

Collection of samples from near-surface soil can be accomplished with tools such as spades, shovels, trowels, and scoops. Surface material is removed to the required depth and a stainless steel or plastic scoop is then used to collect the sample.

This method can be used in most soil types but is limited to sampling at or near the ground surface. Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by the sample team member. A flat, pointed mason trowel to cut a block of the desired soil is helpful when undisturbed profiles are required. Tools plated with chrome or other materials should not be used. Plating is particularly common with garden implements such as potting trowels.

The following procedure is used to collect surface soil samples:

1. Carefully remove the top layer of soil or debris to the desired sample depth with a pre-cleaned spade.

2. Using a pre-cleaned, stainless steel scoop, plastic spoon, or trowel, remove and discard a thin layer of soil from the area which came in contact with the spade.

3. If volatile organic analysis is to be performed, transfer the sample directly into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval or location into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

7.2.2 Sampling at Depth with Augers and Thin Wall Tube Samplers

This system consists of an auger, or a thin-wall tube sampler, a series of extensions, and a "T" handle (Figure 1, Appendix A). The auger is used to bore a hole to a desired sampling depth, and is then withdrawn. The sample may be collected directly from the auger. If a core sample is to be collected, the auger tip is then replaced with a thin wall tube sampler. The system is then lowered down the borehole, and driven into the soil to the completion depth. The system is withdrawn and the core is collected from the thin wall tube sampler.

Several types of augers are available; these include: bucket type, continuous flight (screw), and post-hole augers. Bucket type augers are better for direct sample recovery because they provide a large volume of sample in a short time. When continuous flight augers are used, the sample can be collected directly from the flights. The continuous flight augers are satisfactory when a composite of the complete soil column is desired. Post-hole augers have limited utility for sample collection as they are designed to cut through fibrous, rooted, swampy soil and cannot be used below a depth of approximately three feet.

The following procedure is used for collecting soil samples with the auger:

1. Attach the auger bit to a drill rod extension, and attach the "T" handle to the drill rod.

2. Clear the area to be sampled of any surface debris (e.g., twigs, rocks, litter). It may be advisable to remove the first three to six inches of surface soil for an area approximately six inches in radius around the drilling location.

3. Begin augering, periodically removing and depositing accumulated soils onto a plastic sheet spread near the hole. This prevents accidental brushing of loose material back down the borehole when removing the auger or adding drill rods. It also facilitates refilling the hole, and avoids possible contamination of the surrounding area.

4. After reaching the desired depth, slowly and carefully remove the auger from the hole. When sampling directly from the auger, collect the sample after the auger is removed from the hole and proceed to Step 10.

5. Remove auger tip from the extension rods and replace with a pre-cleaned thin wall tube sampler. Install the proper cutting tip.

6. Carefully lower the tube sampler down the borehole. Gradually force the tube sampler into the soil. Do not scrape the borehole sides. Avoid hammering the rods as the vibrations may cause the boring walls to collapse.

7. Remove the tube sampler, and unscrew the drill rods.

8. Remove the cutting tip and the core from the device.

9. Discard the top of the core (approximately 1 inch), as this possibly represents material collected before penetration of the layer of concern. Place the remaining core into the appropriate labeled sample container. Sample homogenization is not required.

10. If volatile organic analysis is to be performed, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly.

    When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

11. If another sample is to be collected in the same hole, but at a greater depth, reattach the auger bit to the drill and assembly, and follow steps 3 through 11, making sure to decontaminate the auger and tube sampler between samples.

12. Abandon the hole according to applicable state regulations. Generally, shallow holes can simply be backfilled with the removed soil material.

7.2.3 Sampling with a Trier

The system consists of a trier, and a "T" handle. The auger is driven into the soil to be sampled and used to extract a core sample from the appropriate depth.

The following procedure is used to collect soil samples with a sampling trier:

1. Insert the trier (Figure 2, Appendix A) into the material to be sampled at a 0° to 45° angle from horizontal. This orientation minimizes the spillage of sample.

2. Rotate the trier once or twice to cut a core of material.

3. Slowly withdraw the trier, making sure that the slot is facing upward.

4. If volatile organic analyses are required, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

7.2.4 Sampling at Depth with a Split Spoon (Barrel) Sampler

Split spoon sampling is generally used to collect undisturbed soil cores of 18 or 24 inches in length. A series of consecutive cores may be extracted with a split spoon sampler to give a complete soil column profile, or an auger may be used to drill down to the desired depth for sampling. The split spoon is then driven to its sampling depth through the bottom of the augured hole and the core extracted.

When split spoon sampling is performed to gain geologic information, all work should

be performed in accordance with ASTM D1586-98, "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils".

The following procedures are used for collecting soil samples with a split spoon:

1. Assemble the sampler by aligning both sides of barrel and then screwing the drive shoe on the bottom and the head piece on top.

2. Place the sampler in a perpendicular position on the sample material.

3. Using a well ring, drive the tube. Do not drive past the bottom of the head piece or compression of the sample will result.

4. Record in the site logbook or on field data sheets the length of the tube used to penetrate the material being sampled, and the number of blows required to obtain this depth.

5. Withdraw the sampler, and open by unscrewing the bit and head and splitting the barrel. The amount of recovery and soil type should be recorded on the boring log. If a split sample is desired, a cleaned, stainless steel knife should be used to divide the tube contents in half, longitudinally. This sampler is typically available in 2 and 3 1/2 inch diameters. A larger barrel may be necessary to obtain the required sample volume.

6. Without disturbing the core, transfer it to appropriate labeled sample container(s) and seal tightly.

7.2.5 Test Pit/Trench Excavation

A backhoe can be used to remove sections of soil, when detailed examination of soil characteristics are required. This is probably the most expensive sampling method because of the relatively high cost of backhoe operation.

The following procedures are used for collecting soil samples from test pits or trenches:

1. Prior to any excavation with a backhoe, it is important to ensure that all sampling locations are clear of overhead and buried utilities.

2. Review the site specific Health & Safety plan and ensure that all safety precautions including appropriate monitoring equipment are installed as required.

3. Using the backhoe, excavate a trench approximately three feet wide and approximately one foot deep below the cleared sampling location. Place excavated soils on plastic sheets. Trenches greater than five feet deep must be sloped or protected by a shoring system, as required by OSHA regulations.

4. A shovel is used to remove a one to two inch layer of soil from the vertical face of the pit where sampling is to be done.

5. Samples are taken using a trowel, scoop, or coring device at the desired intervals. Be sure to scrape the vertical face at the point of sampling to remove any soil that may have fallen from above, and to expose fresh soil for sampling. In many instances, samples can be collected directly from the backhoe bucket.

6. If volatile organic analyses are required, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

7. Abandon the pit or excavation according to applicable state regulations. Generally, shallow excavations can simply be backfilled with the removed soil material.

8.0 CALCULATIONS

This section is not applicable to this SOP.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

There are no specific quality assurance (QA) activities which apply to the implementation of these procedures. However, the following QA procedures apply:

1. All data must be documented on field data sheets or within site logbooks.

2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration

activities must occur prior to sampling/operation, and they must be documented.

10.0 DATA VALIDATION

This section is not applicable to this SOP.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OHSA and corporate health and safety procedures, in addition to the procedures specified in the site specific Health & Safety Plan..

12.0 REFERENCES

Mason, B.J. 1983. Preparation of Soil Sampling Protocol: Technique and Strategies. EPA-600/4-83-020.

Barth, D.S. and B.J. Mason. 1984. Soil Sampling Quality Assurance User's Guide. EPA-600/4-84-043.

U.S. Environmental Protection Agency. 1984 Characterization of Hazardous Waste Sites - A Methods Manual: Volume II. Available Sampling Methods, Second Edition. EPA-600/4-84-076.

de Vera, E.R., B.P. Simmons, R.D. Stephen, and D.L. Storm. 1980. Samplers and Sampling Procedures for Hazardous Waste Streams. EPA-600/2-80-018.

ASTM D 1586-98, ASTM Committee on Standards, Philadelphia, PA.

APPENDIX A
Figures
SOP #2012
February 2000

FIGURE 1. Sampling Augers

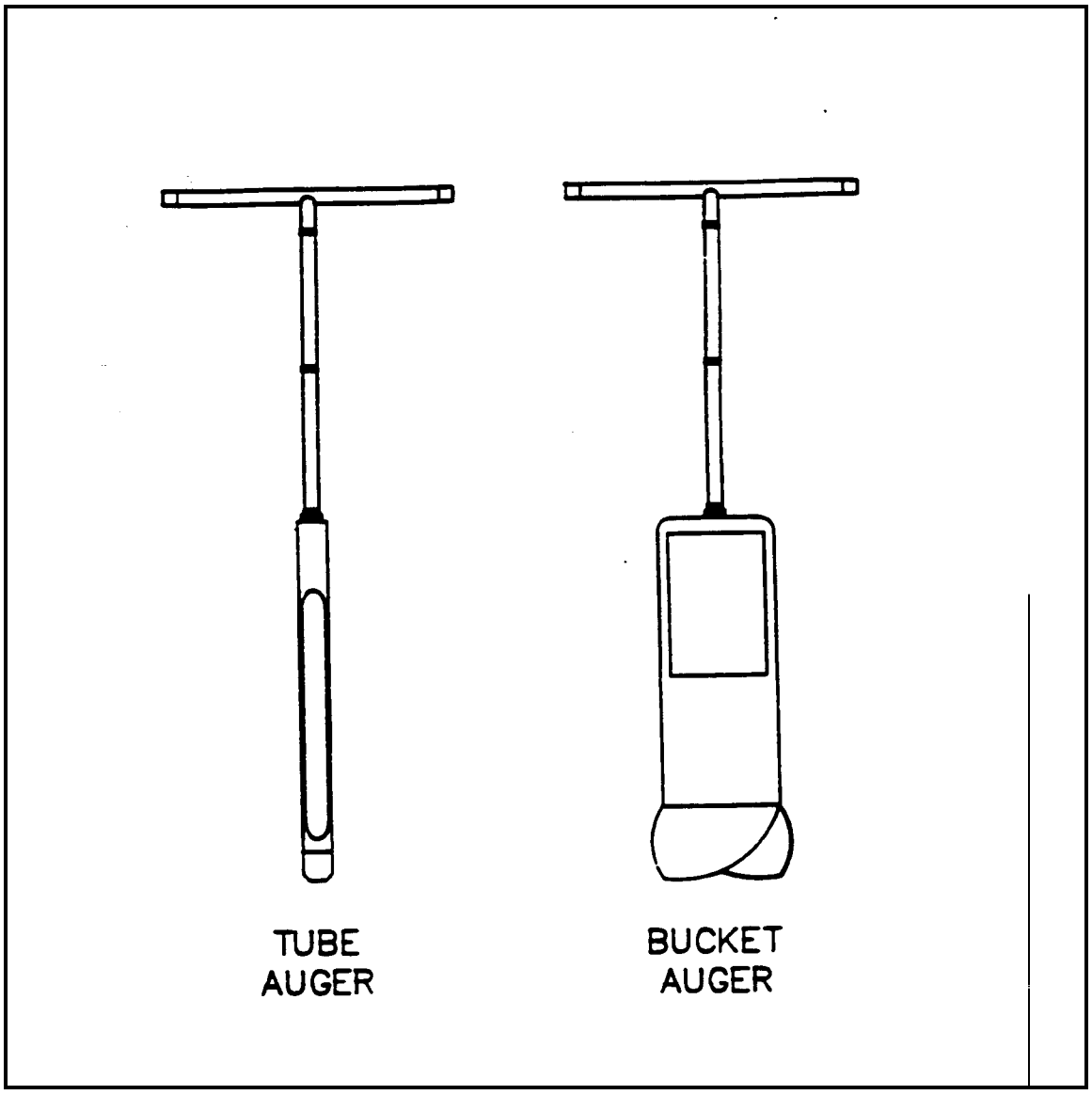
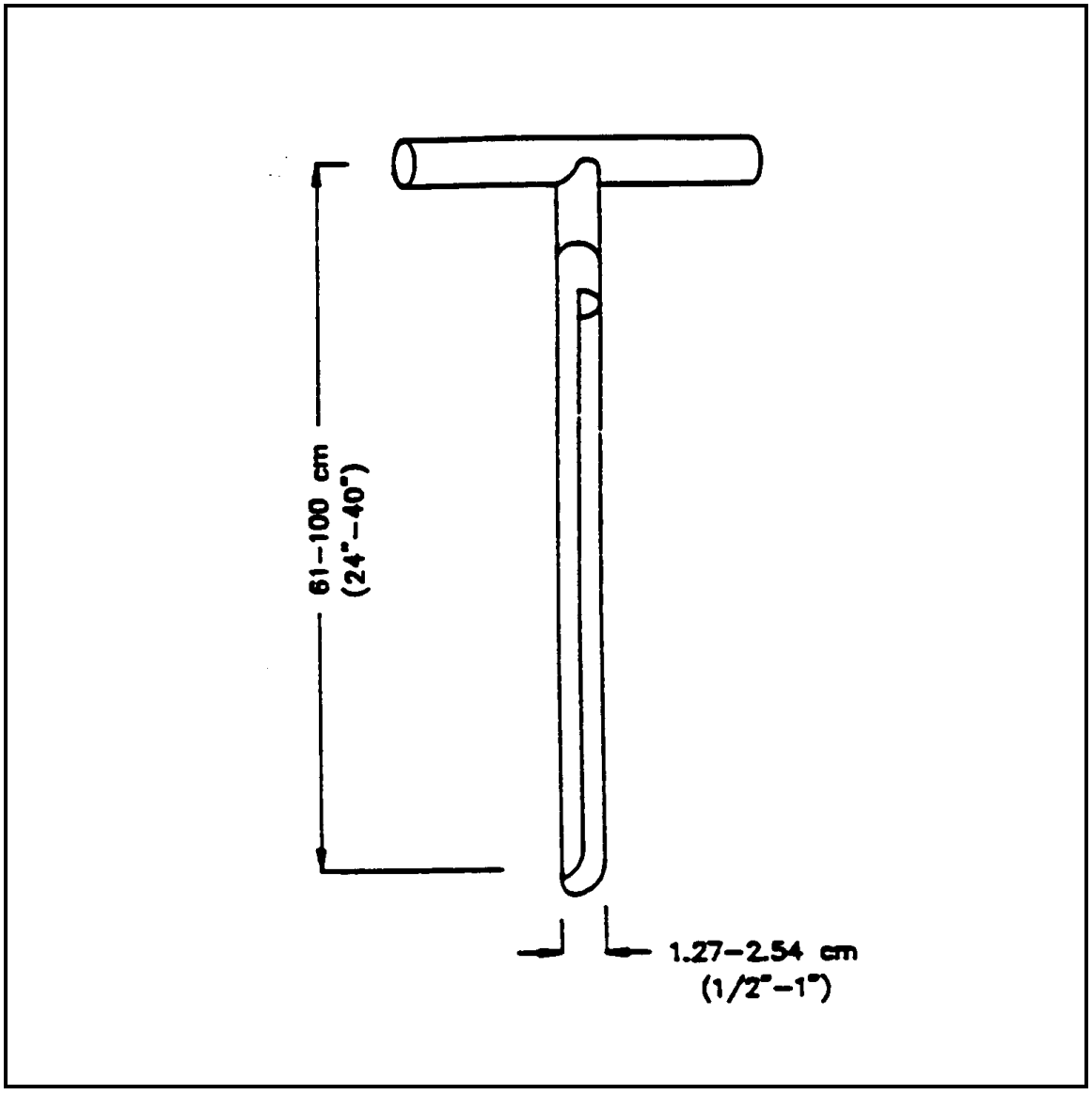


FIGURE 2. Sampling Trier



ATTACHMENT C

EPA Removal Management Levels

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #27); H = HEAST; J = New Jersey; O = EPA Office of Water; F = See FAQ; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	volc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
1.80E-02	C	5.10E-06	C	1.50E-01	I					1	0.1		1.36E+09		ALAR	1596-84-5	3.90E+03	1.30E+04	7.50E+07	3.00E+03	3.50E+04	1.30E+05		2.80E+04
8.70E-03	I			4.00E-03	I					1	0.1		1.36E+09		Acephate	30560-19-1	8.00E+03	2.60E+04		6.10E+03	9.40E+02	3.50E+03		7.40E+02
		2.20E-06	I			9.00E-03	I	V		1		1.07E+05	1.36E+09	8.72E+03	Acetaldehyde	75-07-0			1.10E+03	1.10E+03			2.50E+02	2.50E+02
				2.00E-02	I					1	0.1		1.36E+09		Acetochlor	34256-82-1					4.70E+03	1.70E+04		3.70E+03
				9.00E-01	I	3.10E+01	A	V		1		1.14E+05	1.36E+09	1.37E+04	Acetone	67-64-1					2.10E+05		1.30E+06	1.80E+05
						2.00E-03	X	V		1		1.06E+05	1.36E+09	2.38E+04	Acetone Cyanohydrin	75-86-5							1.50E+02	1.50E+02
						6.00E-02	I	V		1		1.28E+05	1.36E+09	1.30E+04	Acetonitrile	75-05-8							2.40E+03	2.40E+03
				1.00E-01	I			V		1		2.52E+03	1.36E+09	5.97E+04	Acetophenone	98-86-2					2.30E+04			2.30E+04
3.80E+00	C	1.30E-03	C							1	0.1		1.36E+09		Acetylaminofluorene, 2-	53-96-3	1.80E+01	6.00E+01	2.90E+05	1.40E+01				
				5.00E-04	I	2.00E-05	I	V		1		2.27E+04	1.36E+09	6.91E+03	Acrolein	107-02-8					1.20E+02		4.30E-01	4.30E-01
5.00E-01	I	1.00E-04	I	2.00E-03	I	6.00E-03	I		M	1	0.1		1.36E+09		Acrylamide	79-06-1	3.10E+01	1.10E+02	1.40E+06	2.40E+01	4.70E+02	1.70E+03	2.60E+07	3.70E+02
				5.00E-01	I	1.00E-03	I			1	0.1		1.36E+09		Acrylic Acid	79-10-7					1.20E+05	4.40E+05	4.30E+06	9.00E+04
5.40E-01	I	6.80E-05	I	4.00E-02	A	2.00E-03	I	V		1		1.13E+04	1.36E+09	7.69E+03	Acrylonitrile	107-13-1	1.30E+02		3.20E+01	2.50E+01	9.40E+03		4.80E+01	4.80E+01
						6.00E-03	P			1	0.1		1.36E+09		Adiponitrile	111-69-3							2.60E+07	2.60E+07
5.60E-02	C			1.00E-02	I					1	0.1		1.36E+09		Alachlor	15972-60-8	1.20E+03	4.10E+03		9.50E+02	2.30E+03	8.70E+03		1.80E+03
				1.00E-03	I					1	0.1		1.36E+09		Aldicarb	116-06-3					2.30E+02	8.70E+02		1.80E+02
				1.00E-03	I					1	0.1		1.36E+09		Aldicarb Sulfone	1646-88-4					2.30E+02	8.70E+02		1.80E+02
										1	0.1		1.36E+09		Aldicarb sulfoxide	1646-87-3								
1.70E+01	I	4.90E-03	I	3.00E-05	I					1	0.1		1.36E+09		Aldrin	309-00-2	4.10E+00	1.30E+01	7.80E+04	3.10E+00	7.00E+00	2.60E+01		5.50E+00
				2.50E-01	I					1	0.1		1.36E+09		Ally	74223-64-6					5.90E+04	2.20E+05		4.60E+04
				5.00E-03	I	1.00E-04	X			1	0.1		1.36E+09		Allyl Alcohol	107-18-6					1.20E+03	4.40E+03	4.30E+05	9.20E+02
2.10E-02	C	6.00E-06	C			1.00E-03	I	V		1		1.42E+03	1.36E+09	1.58E+03	Allyl Chloride	107-05-1	3.30E+03		7.40E+01	7.20E+01			5.00E+00	5.00E+00
				1.00E+00	P	5.00E-03	P			1			1.36E+09		Aluminum	7429-90-5					2.30E+05		2.10E+07	2.30E+05
				4.00E-04	I					1			1.36E+09		Aluminum Phosphide	20859-73-8					9.40E+01			9.40E+01
				3.00E-04	I					1	0.1		1.36E+09		Amdro	67485-29-4					7.00E+01	2.60E+02		5.50E+01
				9.00E-03	I					1	0.1		1.36E+09		Ametryn	834-12-8					2.10E+03	7.90E+03		1.70E+03
2.10E+01	C	6.00E-03	C							1	0.1		1.36E+09		Aminobiphenyl, 4-	92-67-1	3.30E+00	1.10E+01	6.40E+04	2.50E+00				
				8.00E-02	P					1	0.1		1.36E+09		Aminophenol, m-	591-27-5					1.90E+04	7.00E+04		1.50E+04
				2.00E-02	P					1	0.1		1.36E+09		Aminophenol, p-	123-30-8					4.70E+03	1.70E+04		3.70E+03
				2.50E-03	I					1	0.1		1.36E+09		Amitraz	33089-61-1					5.90E+02	2.20E+03		4.60E+02
						1.00E-01	I			1					Ammonia	7664-41-7								
				2.00E-01	I					1			1.36E+09		Ammonium Sulfamate	7773-06-0					4.70E+04			4.70E+04
						3.00E-03	X	V		1		1.37E+04	1.36E+09	2.62E+04	Amyl Alcohol, tert-	75-85-4							2.50E+02	2.50E+02
5.70E-03	I	1.60E-06	C	7.00E-03	P	1.00E-03	I			1	0.1		1.36E+09		Aniline	62-53-3	1.20E+04	4.00E+04	2.40E+08	9.30E+03	1.60E+03	6.10E+03	4.30E+06	1.30E+03
4.00E-02	P			2.00E-03	X					1	0.1		1.36E+09		Anthraquinone, 9,10-	84-65-1	1.70E+03	5.70E+03		1.30E+03	4.70E+02	1.70E+03		3.70E+02
				4.00E-04	I					0.15			1.36E+09		Antimony (metallic)	7440-36-0					9.40E+01			9.40E+01
				5.00E-04	H					0.15			1.36E+09		Antimony Pentoxide	1314-60-9					1.20E+02			1.20E+02
				9.00E-04	H					0.15			1.36E+09		Antimony Potassium Tartrate	11071-15-1					2.10E+02			2.10E+02
				4.00E-04	H					0.15			1.36E+09		Antimony Tetroxide	1332-81-6					9.40E+01			9.40E+01
						2.00E-04	I			0.15			1.36E+09		Antimony Trioxide	1309-64-4							8.50E+05	8.50E+05
				1.30E-02	I					1	0.1		1.36E+09		Apollo	74115-24-5					3.10E+03	1.10E+04		2.40E+03
2.50E-02	I	7.10E-06	I	5.00E-02	H					1	0.1		1.36E+09		Aramite	140-57-8	2.80E+03	9.10E+03	5.40E+07	2.10E+03	1.20E+04	4.40E+04		9.20E+03
1.50E+00	I	4.30E-03	I	3.00E-04	I	1.50E-05	C			1	0.03		1.36E+09		Arsenic, Inorganic	7440-38-2	7.70E+01	5.10E+02	8.90E+04	6.70E+01	1.20E+02	8.70E+02	6.40E+04	1.00E+02
				3.50E-06	C	5.00E-05	I			1			1.36E+09		Arsine	7784-42-1					8.20E-01		2.10E+05	8.20E-01
				9.00E-03	I					1	0.1		1.36E+09		Assure	76578-14-8					2.10E+03	7.90E+03		1.70E+03
				5.00E-02	I					1	0.1		1.36E+09		Asulam	3337-71-1					1.20E+04	4.40E+04		9.20E+03
2.30E-01	C			3.50E-02	I					1	0.1		1.36E+09		Atrazine	1912-24-9	3.00E+02	9.90E+02		2.30E+02	8.20E+03	3.10E+04		6.50E+03
8.80E-01	C	2.50E-04	C							1	0.1		1.36E+09		Auramine	492-80-8	7.90E+01	2.60E+02	1.50E+06	6.10E+01				
				4.00E-04	I					1	0.1		1.36E+09		Avermectin B1	65195-55-3					9.40E+01	3.50E+02		7.40E+01
1.10E-01	I	3.10E-05	I					V		1			1.36E+09	5.23E+05	Azobenzene	103-33-3	6.30E+02		4.70E+03	5.60E+02				
				1.00E+00	P	7.00E-06	P			1	0.1		1.36E+09		Azodicarbonamide	123-77-3					2.30E+05	8.70E+05	3.00E+04	2.60E+04
				2.00E-01	I	5.00E-04	H			0.07			1.36E+09		Barium	7440-39-3					4.70E+04		2.10E+06	4.60E+04
5.00E-01	C	1.50E-01	C	2.00E-02	C	2.00E-04	C		M	0.025			1.36E+09		Barium Chromate	10294-40-3	3.10E+01		9.20E+02	3.00E+01	4.70E+03		8.50E+05	4.70E+03
				4.00E-03	I					1	0.1		1.36E+09		Baygon	114-26-1					9.40E+02	3.50E+03		7.40E+02
				3.00E-02	I					1	0.1		1.36E+09		Bayleton	43121-43-3					7.00E+03	2.60E+04		5.50E+03
				2.50E-02	I					1	0.1		1.36E+09		Baythroid	68359-37-5					5.90E+03	2.20E+04		4.60E+03
				3.00E-01	I					1	0.1		1.36E+09		Benefin	1861-40-1					7.00E+04	2.60E+05		5.50E+04
				5.00E-02	I					1	0.1		1.36E+09		Benomyl	17804-35-2					1.20E+04	4.40E+04		9.20E+03
				3.00E-02	I					1	0.1		1.36E+09		Bentazon	25057-89-0					7.00E+03	2.60E+04		5.50E+03
				1.00E-01	I			V		1		1.16E+03	1.36E+09	2.25E+04	Benzaldehyde	100-52-7					2.30E+04			2.30E+04
5.50E-02	I	7.80E-06	I	4.00E-03	I	3.00E-02	I	V		1		1.82E+03	1.36E+09	3.54E+03	Benzene	71-43-2	1.30E+03		1.30E+02	1.20E+02	9.40E+02		3.30E+02	2.50E+02
1.00E-01	X			3.00E-04	X					1	0.1		1.36E+09		Benzenediamine-2-methyl sulfate, 1,4-	6369-59-1	7.00E+02	2.30E+03		5.30E+02	7.00E+01	2.60E+02		5.50E+01
				1.00E-03	P			V		1		1.26E+03	1.36E+09	1.94E+04	Benzenethiol	108-98-5					2.30E+02			2.30E+02
2.30E+02	I	6.70E-02	I	3.00E-03	I				M	1	0.1		1.36E+09		Benzidine	92-87-5	6.70E-02	2.30E-01	2.10E+03	5.20E-02	7.00E+02	2.60E+03		5.50E+02
				4.00E+00	I					1	0.1		1.36E+09		Benzoic Acid	65-85-0					9.40E+05	3.50E+06		7.40E+05
1.30E+01	I							V		1		3.24E+02	1.36E+09	6.76E+04	Benzotrichloride	98-07-7	5.30E+00			5.30E+00				
				1.00E-01	P					1	0.1		1.36E+09		Benzyl Alcohol	100-51-6					2.30E+04	8.70E+04		1.80E+04
1.70E-01	I	4.90E-05	C	2.00E-03	P	1.00E-03	P	V		1		1.46E+03	1.36E+09	2.55E+04	Benzyl Chloride	100-44-7	4.10E+02		1.50E+02	1.10E+02	4.70E+02		8.00E+01	6.80E+01
		2.40E-03	I	2.00E-03	I	2.00E-05	I			0.007			1.36E+09		Beryllium and compounds	7440-41-7			1.60E+05	1.60E+05	4.70E+02		8.50E+04	4.70E+02
				1.00E-04	I					1	0.1		1.36E+09		Bidrin	141-66-2					2.30E+01	8.70E+01		1.80E+01
				9.00E-03	P					1	0.1		1.36E+09		Bifenox	42576-02-3					2.10E+03	7.90E+03		1.70E+03
				1.50E-02	I					1	0.1		1.36E+09		Biphenthrin	82657-04-3					3.50E+03	1.30E+04		2.80E+03
8.00E-03	I			5.00E-01	I	4.00E-04	X	V		1			1.36E+09	1.14E+05	Biphenyl, 1,1'-	92-52-4	8.70E+03			8.70E+03	1.20E+05		1.40E+02	1.40E+02
7.00E-02	H	1.00E-05	H	4.00E-02	I			V		1		1.02E+03	1.36E+09	3.50E+04	Bis(2-chloro-1-methylethyl) ether	108-60-1	9.90E+02		9.80E+02	4.90E+02	9.40E+03			9.40E+03
				3.00E-03	P					1	0.1		1.36E+09		Bis(2-chloroethoxy)methane	111-91-1					7.00E+02	2.60E+03		5.50E+02

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #27); H = HEAST; J = New Jersey; O = EPA Office of Water; F = See FAQ; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
1.10E+00	I	3.30E-04	I					V		1		5.05E+03	1.36E+09	4.25E+04	Bis(2-chloroethyl)ether	111-44-4	6.30E+01		3.60E+01	2.30E+01				
2.20E+02	I	6.20E-02	I					V		1		4.22E+03	1.36E+09	1.88E+03	Bis(chloromethyl)ether	542-88-1	3.20E-01		8.50E-03	8.30E-03				
				5.00E-02	I					1	0.1		1.36E+09		Bisphenol A	80-05-7					1.20E+04	4.40E+04		9.20E+03
				2.00E-01	I	2.00E-02	H			1			1.36E+09		Boron And Borates Only	7440-42-8					4.70E+04		8.50E+07	4.70E+04
				2.00E+00	P	2.00E-02	P			1			1.36E+09		Boron Trichloride	10294-34-5					4.70E+05		8.50E+07	4.70E+05
				4.00E-02	C	1.30E-02	C			1			1.36E+09		Boron Trifluoride	7637-07-2					9.40E+03		5.50E+07	9.40E+03
7.00E-01	I			4.00E-03	I					1			1.36E+09		Bromate	15541-45-4	9.90E+01			9.90E+01	9.40E+02			9.40E+02
2.00E+00	X	6.00E-04	X					V		1		2.38E+03	1.36E+09	5.92E+03	Bromo-2-chloroethane, 1-	107-04-0	3.50E+01		2.80E+00	2.60E+00				
				8.00E-03	I	6.00E-02	I	V		1		6.79E+02	1.36E+09	8.37E+03	Bromobenzene	108-86-1					1.90E+03		1.60E+03	8.60E+02
						4.00E-02	X	V		1		4.04E+03	1.36E+09	3.58E+03	Bromochloromethane	74-97-5							4.50E+02	4.50E+02
6.20E-02	I	3.70E-05	C	2.00E-02	I			V		1		9.31E+02	1.36E+09	3.97E+03	Bromodichloromethane	75-27-4	1.10E+03		3.00E+01	2.90E+01	4.70E+03			4.70E+03
7.90E-03	I	1.10E-06	I	2.00E-02	I					1	0.1		1.36E+09		Bromoform	75-25-2	8.80E+03	2.90E+04	3.50E+08	6.70E+03	4.70E+03	1.70E+04		3.70E+03
				1.40E-03	I	5.00E-03	I	V		1		3.59E+03	1.36E+09	1.40E+03	Bromomethane	74-83-9					3.30E+02		2.20E+01	2.10E+01
				5.00E-03	H					1	0.1		1.36E+09		Bromophos	2104-96-3					1.20E+03	4.40E+03		9.20E+02
				2.00E-02	I					1	0.1		1.36E+09		Bromoxynil	1689-84-5					4.70E+03	1.70E+04		3.70E+03
				2.00E-02	I					1	0.1		1.36E+09		Bromoxynil Octanoate	1689-99-2					4.70E+03	1.70E+04		3.70E+03
3.40E+00	C	3.00E-05	I			2.00E-03	I	V		1		6.67E+02	1.36E+09	8.66E+02	Butadiene, 1,3-	106-99-0	2.00E+01		8.10E+00	5.80E+00			5.40E+00	5.40E+00
				1.00E-01	I					1	0.1		1.36E+09		Butanol, N-	71-36-3					2.30E+04	8.70E+04		1.80E+04
1.90E-03	P			2.00E-01	I					1	0.1		1.36E+09		Butyl Benzyl Phthlate	85-68-7	3.70E+04	1.20E+05		2.80E+04	4.70E+04	1.70E+05		3.70E+04
				2.00E+00	P	3.00E+01	P			1	0.1		1.36E+09		Butyl alcohol, sec-	78-92-2					4.70E+05	1.70E+06	1.30E+11	3.70E+05
				5.00E-02	I					1	0.1		1.36E+09		Butylate	2008-41-5					1.20E+04	4.40E+04		9.20E+03
2.00E-04	C	5.70E-08	C							1	0.1		1.36E+09		Butylated hydroxyanisole	25013-16-5	3.50E+05	1.10E+06	6.70E+09	2.70E+05				
3.60E-03	P			3.00E-01	P					1	0.1		1.36E+09		Butylated hydroxytoluene	128-37-0	1.90E+04	6.30E+04		1.50E+04	7.00E+04	2.60E+05		5.50E+04
				5.00E-02	P			V		1		1.08E+02	1.36E+09	8.14E+03	Butylbenzene, n-	104-51-8					1.20E+04			1.20E+04
				1.00E-01	X			V		1		1.45E+02	1.36E+09	7.35E+03	Butylbenzene, sec-	135-98-8					2.30E+04			2.30E+04
				1.00E-01	X			V		1		1.83E+02	1.36E+09	7.36E+03	Butylbenzene, tert-	98-06-6					2.30E+04			2.30E+04
				2.00E-02	A					1	0.1		1.36E+09		Cacodylic Acid	75-60-5					4.70E+03	1.70E+04		3.70E+03
		1.80E-03	I	1.00E-03	I	1.00E-05	A			0.025	0.001		1.36E+09		Cadmium (Diet)	7440-43-9			2.10E+05	2.10E+05	2.30E+02	2.20E+03	4.30E+04	2.10E+02
		1.80E-03	I	5.00E-04	I	1.00E-05	A			0.05	0.001				Cadmium (Water)	7440-43-9								
5.00E-01	C	1.50E-01	C	2.00E-02	C	2.00E-04	C		M	0.025			1.36E+09		Calcium Chromate	13765-19-0	3.10E+01		9.20E+02	3.00E+01	4.70E+03		8.50E+05	4.70E+03
				5.00E-01	I	2.20E-03	C			1	0.1		1.36E+09		Caprolactam	105-60-2					1.20E+05	4.40E+05	9.40E+06	9.20E+04
1.50E-01	C	4.30E-05	C	2.00E-03	I					1	0.1		1.36E+09		Captafol	2425-06-1	4.60E+02	1.50E+03	8.90E+06	3.60E+02	4.70E+02	1.70E+03		3.70E+02
2.30E-03	C	6.60E-07	C	1.30E-01	I					1	0.1		1.36E+09		Captan	133-06-2	3.00E+04	9.90E+04	5.80E+08	2.30E+04	3.10E+04	1.10E+05		2.40E+04
				1.00E-01	I					1	0.1		1.36E+09		Carbaryl	63-25-2					2.30E+04	8.70E+04		1.80E+04
				5.00E-03	I					1	0.1		1.36E+09		Carbofuran	1563-66-2					1.20E+03	4.40E+03		9.20E+02
				1.00E-01	I	7.00E-01	I	V		1		7.38E+02	1.36E+09	1.17E+03	Carbon Disulfide	75-15-0					2.30E+04		2.60E+03	2.30E+03
7.00E-02	I	6.00E-06	I	4.00E-03	I	1.00E-01	I	V		1		4.58E+02	1.36E+09	1.49E+03	Carbon Tetrachloride	56-23-5	9.90E+02		7.00E+01	6.50E+01	9.40E+02		4.70E+02	3.10E+02
				1.00E-02	I					1	0.1		1.36E+09		Carbosulfan	55285-14-8					2.30E+03	8.70E+03		1.80E+03
				1.00E-01	I					1	0.1		1.36E+09		Carboxin	5234-68-4					2.30E+04	8.70E+04		1.80E+04
						9.00E-04	I			1			1.36E+09		Ceric oxide	1306-38-3							3.80E+06	3.80E+06
				1.00E-01	I					1	0.1		1.36E+09		Chloral Hydrate	302-17-0					2.30E+04	8.70E+04		1.80E+04
				1.50E-02	I					1	0.1		1.36E+09		Chloramben	133-90-4					3.50E+03	1.30E+04		2.80E+03
4.00E-01	H									1	0.1		1.36E+09		Chloranil	118-75-2	1.70E+02	5.60E+02		1.30E+02				
3.50E-01	I	1.00E-04	I	5.00E-04	I	7.00E-04	I			1	0.04		1.36E+09		Chlordane	12789-03-6	2.00E+02	1.60E+03	3.80E+06	1.80E+02	1.20E+02	1.10E+03	3.00E+06	1.10E+02
1.00E+01	I	4.60E-03	C	3.00E-04	I					1	0.1		1.36E+09		Chlordecone (Kepone)	143-50-0	7.00E+00	2.30E+01	8.30E+04	5.30E+00	7.00E+01	2.60E+02		5.50E+01
				7.00E-04	A					1	0.1		1.36E+09		Chlorfenvinphos	470-90-6					1.60E+02	6.10E+02		1.30E+02
				2.00E-02	I					1	0.1		1.36E+09		Chlorimuron, Ethyl-	90982-32-4					4.70E+03	1.70E+04		3.70E+03
				1.00E-01	I	1.50E-04	A			1			1.36E+09		Chlorine	7782-50-5					2.30E+04		6.20E+05	2.30E+04
				3.00E-02	I	2.00E-04	I			1			1.36E+09		Chlorine Dioxide	10049-04-4					7.00E+03		8.50E+05	7.00E+03
				3.00E-02	I					1			1.36E+09		Chlorite (Sodium Salt)	7758-19-2					7.00E+03			7.00E+03
						5.00E+01	I	V		1		1.15E+03	1.36E+09	1.03E+03	Chloro-1,1-difluoroethane, 1-	75-68-3							1.60E+05	1.60E+05
		3.00E-04	I	2.00E-02	H	2.00E-02	I	V		1		7.51E+02	1.36E+09	1.08E+03	Chloro-1,3-butadiene, 2-	126-99-8			1.00E+00	1.00E+00	4.70E+03		6.70E+01	6.70E+01
4.60E-01	H									1	0.1		1.36E+09		Chloro-2-methylaniline HCl, 4-	3165-93-3	1.50E+02	4.90E+02		1.20E+02				
1.00E-01	P	7.70E-05	C	3.00E-03	X					1	0.1		1.36E+09		Chloro-2-methylaniline, 4-	95-69-2	7.00E+02	2.30E+03	5.00E+06	5.30E+02	7.00E+02	2.60E+03		5.50E+02
2.70E-01	X							V		1	0.1	2.83E+04	1.36E+09	1.86E+04	Chloroacetaldehyde, 2-	107-20-0	2.60E+02	8.40E+02		2.00E+02				
				2.00E-03	H					1	0.1		1.36E+09		Chloroacetic Acid	79-11-8					4.70E+02	1.70E+03		3.70E+02
						3.00E-05	I			1	0.1		1.36E+09		Chloroacetophenone, 2-	532-27-4							1.30E+05	1.30E+05
2.00E-01	P			4.00E-03	I					1	0.1		1.36E+09		Chloroaniline, p-	106-47-8	3.50E+02	1.10E+03		2.70E+02	9.40E+02	3.50E+03		7.40E+02
				2.00E-02	I	5.00E-02	P	V		1		7.61E+02	1.36E+09	6.45E+03	Chlorobenzene	108-90-7					4.70E+03		1.00E+03	8.30E+02
1.10E-01	C	3.10E-05	C	2.00E-02	I					1	0.1		1.36E+09		Chlorobenzilate	510-15-6	6.30E+02	2.10E+03	1.20E+07	4.80E+02	4.70E+03	1.70E+04		3.70E+03
				3.00E-02	X					1	0.1		1.36E+09		Chlorobenzoic Acid, p-	74-11-3					7.00E+03	2.60E+04		5.50E+03
				3.00E-03	P	3.00E-01	P	V		1		1.17E+02	1.36E+09	6.76E+03	Chlorobenzotrifluoride, 4-	98-56-6					7.00E+02		6.30E+03	6.30E+02
				4.00E-02	P			V		1		7.28E+02	1.36E+09	1.76E+03	Chlorobutane, 1-	109-69-3					9.40E+03			9.40E+03
						5.00E+01	I	V		1		1.68E+03	1.36E+09	9.38E+02	Chlorodifluoromethane	75-45-6							1.50E+05	1.50E+05
				2.00E-02	P					1	0.1		1.36E+09		Chloroethanol, 2-	107-07-3					4.70E+03	1.70E+04		3.70E+03
3.10E-02	C	2.30E-05	I	1.00E-02	I	9.80E-02	A	V		1		2.54E+03	1.36E+09	2.63E+03	Chloroform	67-66-3	2.20E+03		3.20E+01	3.20E+01	2.30E+03		8.00E+02	6.00E+02
						9.00E-02	I	V		1		1.32E+03	1.36E+09	1.18E+03	Chloromethane	74-87-3							3.30E+02	3.30E+02
2.40E+00	C	6.90E-04	C					V		1		2.58E+04	1.36E+09	5.33E+03	Chloromethyl Methyl Ether	107-30-2	2.90E+01		2.20E+00	2.00E+00				
3.00E-01	P			3.00E-03	P	1.00E-05	X			1	0.1		1.36E+09		Chloronitrobenzene, o-	88-73-3	2.30E+02	7.60E+02		1.80E+02	7.00E+02	2.60E+03	4.30E+04	5.50E+02
6.30E-03	P			1.00E-03	P	6.00E-04	P			1	0.1		1.36E+09		Chloronitrobenzene, p-	100-00-5	1.10E+04	3.60E+04		8.50E+03	2.30E+02	8.70E+02	2.60E+06	1.80E+02
				5.00E-03	I			V		1		2.19E+04	1.36E+09	1.24E+05	Chlorophenol, 2-	95-57-8					1.20E+03			1.20E+03
						4.00E-04	C	V		1		6.17E+02	1.36E+09	4.68E+03	Chloropicrin	76-06-2							5.90E+00	5.90E+00
3.10E-03	C	8.90E-07	C	1.50E-02	I					1	0.1		1.36E+09		Chlorothalonil	1897-45-6	2.20E+04	7.30E+04	4.30E+08	1.70E+04	3.50E+03	1.30E+04		2.80E+03
				2.00E-02	I			V		1		9.07E+02	1.36E+09	8.12E+03	Chlorotoluene, o-	95-49-8					4.70E+03			4.70E+03
				2.00E-02	X			V		1		2.53E+02	1.36E+09	7.29E+03	Chlorotoluene, p-	106-43-4					4.70E+03			4.70E+03

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Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
2.40E+02	C	6.90E-02	C							1	0.1		1.36E+09		Chlorozotocin	54749-90-5	2.90E-01	9.50E-01	5.50E+03	2.20E-01				
				2.00E-01	I					1	0.1		1.36E+09		Chlorpropham	101-21-3					4.70E+04	1.70E+05		3.70E+04
				1.00E-03	A					1	0.1		1.36E+09		Chlorpyrifos	2921-88-2					2.30E+02	8.70E+02		1.80E+02
				1.00E-02	H					1	0.1		1.36E+09		Chlorpyrifos Methyl	5598-13-0					2.30E+03	8.70E+03		1.80E+03
				5.00E-02	I					1	0.1		1.36E+09		Chlorsulfuron	64902-72-3					1.20E+04	4.40E+04		9.20E+03
				8.00E-04	H					1	0.1		1.36E+09		Chlorthiophos	60238-56-4					1.90E+02	7.00E+02		1.50E+02
				1.50E+00	I					0.013			1.36E+09		Chromium(III), Insoluble Salts	16065-83-1					3.50E+05			3.50E+05
5.00E-01	J	8.40E-02	S	3.00E-03	I	1.00E-04	I		M	0.025			1.36E+09		Chromium(VI)	18540-29-9	3.10E+01		1.60E+03	3.00E+01	7.00E+02		4.30E+05	7.00E+02
										0.013			1.36E+09		Chromium, Total	7440-47-3								
		9.00E-03	P	3.00E-04	P	6.00E-06	P			1			1.36E+09		Cobalt	7440-48-4			4.20E+04	4.20E+04	7.00E+01		2.60E+04	7.00E+01
		6.20E-04	I						M	1	0.1				Coke Oven Emissions	8007-45-2								
				4.00E-02	H					1			1.36E+09		Copper	7440-50-8					9.40E+03			9.40E+03
				5.00E-02	I	6.00E-01	C			1	0.1		1.36E+09		Cresol, m-	108-39-4					1.20E+04	4.40E+04	2.60E+09	9.20E+03
				5.00E-02	I	6.00E-01	C			1	0.1		1.36E+09		Cresol, o-	95-48-7					1.20E+04	4.40E+04	2.60E+09	9.20E+03
				1.00E-01	A	6.00E-01	C			1	0.1		1.36E+09		Cresol, p-	106-44-5					2.30E+04	8.70E+04	2.60E+09	1.80E+04
				1.00E-01	A					1	0.1		1.36E+09		Cresol, p-chloro-m-	59-50-7					2.30E+04	8.70E+04		1.80E+04
				1.00E-01	A	6.00E-01	C			1	0.1		1.36E+09		Cresols	1319-77-3					2.30E+04	8.70E+04	2.60E+09	1.80E+04
1.90E+00	H			1.00E-03	P			V		1		1.66E+04	1.36E+09	1.89E+04	Crotonaldehyde, trans-	123-73-9	3.70E+01			3.70E+01	2.30E+02			2.30E+02
				1.00E-01	I	4.00E-01	I	V		1		2.68E+02	1.36E+09	6.21E+03	Cumene	98-82-8					2.30E+04		7.80E+03	5.80E+03
2.20E-01	C	6.30E-05	C							1	0.1		1.36E+09		Cupferron	135-20-6	3.20E+02	1.00E+03	6.10E+06	2.40E+02				
8.40E-01	H			2.00E-03	H					1	0.1		1.36E+09		Cyanazine	21725-46-2	8.30E+01	2.70E+02		6.30E+01	4.70E+02	1.70E+03		3.70E+02
															Cyanides									
				1.00E-03	I					1			1.36E+09		~Calcium Cyanide	592-01-8					2.30E+02			2.30E+02
				5.00E-03	I					1			1.36E+09		~Copper Cyanide	544-92-3					1.20E+03			1.20E+03
				6.00E-04	I	8.00E-04	S	V		1		1.00E+07	1.36E+09	4.66E+04	~Cyanide (CN-)	57-12-5					1.40E+02		1.20E+02	6.40E+01
				1.00E-03	I			V		1			1.36E+09		~Cyanogen	460-19-5					2.30E+02			2.30E+02
				9.00E-02	I			V		1			1.36E+09		~Cyanogen Bromide	506-68-3					2.10E+04			2.10E+04
				5.00E-02	I			V		1			1.36E+09		~Cyanogen Chloride	506-77-4					1.20E+04			1.20E+04
				6.00E-04	I	8.00E-04	I	V		1		1.00E+07	1.36E+09	5.22E+04	~Hydrogen Cyanide	74-90-8					1.40E+02		1.30E+02	6.80E+01
				2.00E-03	I					1			1.36E+09		~Potassium Cyanide	151-50-8					4.70E+02			4.70E+02
				5.00E-03	I					0.04			1.36E+09		~Potassium Silver Cyanide	506-61-6					1.20E+03			1.20E+03
				1.00E-01	I					0.04			1.36E+09		~Silver Cyanide	506-64-9					2.30E+04			2.30E+04
				1.00E-03	I					1			1.36E+09		~Sodium Cyanide	143-33-9					2.30E+02			2.30E+02
				2.00E-04	P					1			1.36E+09		~Thiocyanates	NA					4.70E+01			4.70E+01
				2.00E-04	X					1			1.36E+09		~Thiocyanic Acid	463-56-9					4.70E+01			4.70E+01
				5.00E-02	I					1			1.36E+09		~Zinc Cyanide	557-21-1					1.20E+04			1.20E+04
						6.00E+00	I	V		1		1.17E+02	1.36E+09	1.04E+03	Cyclohexane	110-82-7							2.00E+04	2.00E+04
2.30E-02	H									1	0.1		1.36E+09		Cyclohexane, 1,2,3,4,5-pentabromo-6-chloro-	87-84-3	3.00E+03	9.90E+03		2.30E+03				
				5.00E+00	I	7.00E-01	P			1	0.1		1.36E+09		Cyclohexanone	108-94-1					1.20E+06	4.40E+06	3.00E+09	9.20E+05
				5.00E-03	P	1.00E+00	X	V		1		2.83E+02	1.36E+09	1.33E+03	Cyclohexene	110-83-8					1.20E+03		4.20E+03	9.20E+02
				2.00E-01	I					1	0.1		1.36E+09		Cyclohexylamine	108-91-8					4.70E+04	1.70E+05		3.70E+04
				5.00E-03	I					1	0.1		1.36E+09		Cyhalothrin/karate	68085-85-8					1.20E+03	4.40E+03		9.20E+02
				1.00E-02	I					1	0.1		1.36E+09		Cypermethrin	52315-07-8					2.30E+03	8.70E+03		1.80E+03
				7.50E-03	I					1	0.1		1.36E+09		Cyromazine	66215-27-8					1.80E+03	6.50E+03		1.40E+03
2.40E-01	I	6.90E-05	C							1	0.1		1.36E+09		DDD	72-54-8	2.90E+02	9.50E+02	5.50E+06	2.20E+02				
3.40E-01	I	9.70E-05	C							1	0.1		1.36E+09		DDE, p,p'-	72-55-9	2.00E+02	6.70E+02	3.90E+06	1.60E+02				
3.40E-01	I	9.70E-05	I	5.00E-04	I					1	0.03		1.36E+09		DDT	50-29-3	2.00E+02	2.20E+03	3.90E+06	1.90E+02	1.20E+02	1.50E+03		1.10E+02
				1.00E-02	I					1	0.1		1.36E+09		Dacthal	1861-32-1					2.30E+03	8.70E+03		1.80E+03
				3.00E-02	I					1	0.1		1.36E+09		Dalapon	75-99-0					7.00E+03	2.60E+04		5.50E+03
7.00E-04	I			7.00E-03	I					1	0.1		1.36E+09		Decabromodiphenyl ether, 2,2',3,3',4,4',5,5',6,6'- (BDE-209)	1163-19-5	9.90E+04	3.30E+05		7.60E+04	1.60E+03	6.10E+03		1.30E+03
				4.00E-05	I					1	0.1		1.36E+09		Demeton	8065-48-3					9.40E+00	3.50E+01		7.40E+00
1.20E-03	I			6.00E-01	I					1	0.1		1.36E+09		Di(2-ethylhexyl)adipate	103-23-1	5.80E+04	1.90E+05		4.40E+04	1.40E+05	5.20E+05		1.10E+05
6.10E-02	H									1	0.1		1.36E+09		Diallate	2303-16-4	1.10E+03	3.70E+03		8.70E+02				
				7.00E-04	A					1	0.1		1.36E+09		Diazinon	333-41-5					1.60E+02	6.10E+02		1.30E+02
				1.00E-02	X			V		1			1.36E+09	4.10E+05	Dibenzothiophene	132-65-0					2.30E+03			2.30E+03
8.00E-01	P	6.00E-03	P	2.00E-04	P	2.00E-04	I	V	M	1		9.79E+02	1.36E+09	3.20E+04	Dibromo-3-chloropropane, 1,2-	96-12-8	1.90E+01		5.40E-01	5.30E-01	4.70E+01		2.00E+01	1.40E+01
				4.00E-04	X					1	0.1		1.36E+09		Dibromobenzene, 1,3-	108-36-1					9.40E+01	3.50E+02		7.40E+01
				1.00E-02	I					1	0.1		1.36E+09		Dibromobenzene, 1,4-	106-37-6					2.30E+03	8.70E+03		1.80E+03
8.40E-02	I	2.70E-05	C	2.00E-02	I			V		1	0.1	8.02E+02	1.36E+09	7.95E+03	Dibromochloromethane	124-48-1	8.30E+02	2.70E+03	8.30E+01	7.30E+01	4.70E+03	1.70E+04		3.70E+03
2.00E+00	I	6.00E-04	I	9.00E-03	I	9.00E-03	I	V		1		1.34E+03	1.36E+09	8.64E+03	Dibromoethane, 1,2-	106-93-4	3.50E+01		4.00E+00	3.60E+00	2.10E+03		2.40E+02	2.20E+02
				1.00E-02	H	4.00E-03	X	V		1		2.82E+03	1.36E+09	5.64E+03	Dibromomethane (Methylene Bromide)	74-95-3					2.30E+03		7.10E+01	6.90E+01
				3.00E-04	P					1	0.1		1.36E+09		Dibutyltin Compounds	NA					7.00E+01	2.60E+02		5.50E+01
				3.00E-02	I					1	0.1		1.36E+09		Dicamba	1918-00-9					7.00E+03	2.60E+04		5.50E+03
		4.20E-03	P					V		1		5.19E+02	1.36E+09	1.11E+04	Dichloro-2-butene, 1,4-	764-41-0			7.40E-01	7.40E-01				
		4.20E-03	P					V		1	0.1	5.19E+02	1.36E+09	1.11E+04	Dichloro-2-butene, cis-1,4-	1476-11-5			7.40E-01	7.40E-01				
		4.20E-03	P					V		1	0.1	7.60E+02	1.36E+09	1.11E+04	Dichloro-2-butene, trans-1,4-	110-57-6			7.40E-01	7.40E-01				
5.00E-02	I			4.00E-03	I					1	0.1		1.36E+09		Dichloroacetic Acid	79-43-6	1.40E+03	4.60E+03		1.10E+03	9.40E+02	3.50E+03		7.40E+02
				9.00E-02	I	2.00E-01	H	V		1		3.76E+02	1.36E+09	1.17E+04	Dichlorobenzene, 1,2-	95-50-1					2.10E+04		7.30E+03	5.40E+03
5.40E-03	C	1.10E-05	C	7.00E-02	A	8.00E-01	I	V		1			1.36E+09	1.04E+04	Dichlorobenzene, 1,4-	106-46-7	1.30E+04		2.70E+02	2.60E+02	1.60E+04		2.60E+04	1.00E+04
4.50E-01	I	3.40E-04	C							1	0.1		1.36E+09		Dichlorobenzidine, 3,3'-	91-94-1	1.50E+02	5.10E+02	1.10E+06	1.20E+02				
				9.00E-03	X					1	0.1		1.36E+09		Dichlorobenzophenone, 4,4'-	90-98-2					2.10E+03	7.90E+03		1.70E+03
				2.00E-01	I	1.00E-01	X	V		1		8.45E+02	1.36E+09	8.41E+02	Dichlorodifluoromethane	75-71-8					4.70E+04		2.60E+02	2.60E+02
5.70E-03	C	1.60E-06	C	2.00E-01	P			V		1		1.69E+03	1.36E+09	2.08E+03	Dichloroethane, 1,1-	75-34-3	1.20E+04		3.70E+02	3.60E+02	4.70E+04			4.70E+04
9.10E-02	I	2.60E-05	I	6.00E-03	X	7.00E-03	P	V		1		2.98E+03	1.36E+09	4.57E+03	Dichloroethane, 1,2-	107-06-2	7.60E+02		4.90E+01	4.60E+01	1.40E+03		1.00E+02	9.40E+01
				5.00E-02	I	2.00E-01	I	V		1		1.19E+03	1.36E+09	1.16E+03	Dichloroethylene, 1,1-	75-35-4					1.20E+04		7.20E+02	6.80E+02

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Toxicity and Chemical-specific Information														Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO ($(mg/kg\text{-}day)^{-1}$)	key	IUR ($(ug/m^3)^{-1}$)	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	volc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
				2.00E-03	I			V		1		2.37E+03	1.36E+09	2.50E+03	Dichloroethylene, 1,2-cis-	156-59-2					4.70E+02			4.70E+02
				2.00E-02	I			V		1		1.67E+03	1.36E+09	2.51E+03	Dichloroethylene, 1,2-trans-	156-60-5					4.70E+03			4.70E+03
				3.00E-03	I					1	0.1		1.36E+09		Dichlorophenol, 2,4-	120-83-2					7.00E+02	2.60E+03		5.50E+02
				1.00E-02	I					1	0.05		1.36E+09		Dichlorophenoxy Acetic Acid, 2,4-	94-75-7					2.30E+03	1.70E+04		2.10E+03
				8.00E-03	I					1	0.1		1.36E+09		Dichlorophenoxy)butyric Acid, 4-(2,4-	94-82-6					1.90E+03	7.00E+03		1.50E+03
3.60E-02	C	1.00E-05	C	9.00E-02	A	4.00E-03	I	V		1		1.36E+03	1.36E+09	3.79E+03	Dichloropropane, 1,2-	78-87-5	1.90E+03		1.10E+02	1.00E+02	2.10E+04		4.70E+01	4.70E+01
				2.00E-02	P			V		1		1.49E+03	1.36E+09	6.76E+03	Dichloropropane, 1,3-	142-28-9					4.70E+03			4.70E+03
				3.00E-03	I					1	0.1		1.36E+09		Dichloropropanol, 2,3-	616-23-9					7.00E+02	2.60E+03		5.50E+02
1.00E-01	I	4.00E-06	I	3.00E-02	I	2.00E-02	I	V		1		1.57E+03	1.36E+09	3.55E+03	Dichloropropene, 1,3-	542-75-6	7.00E+02		2.50E+02	1.80E+02	7.00E+03		2.20E+02	2.20E+02
2.90E-01	I	8.30E-05	C	5.00E-04	I	5.00E-04	I			1	0.1		1.36E+09		Dichlorvos	62-73-7	2.40E+02	7.80E+02	4.60E+06	1.80E+02	1.20E+02	4.40E+02	2.10E+06	9.20E+01
				8.00E-02	P	3.00E-04	X	V		1			1.36E+09	4.11E+03	Dicyclopentadiene	77-73-6					1.90E+04		3.90E+00	3.90E+00
1.60E+01	I	4.60E-03	I	5.00E-05	I					1	0.1		1.36E+09		Dieldrin	60-57-1	4.30E+00	1.40E+01	8.30E+04	3.30E+00	1.20E+01	4.40E+01		9.20E+00
		3.00E-04	C			5.00E-03	I			1	0.1				Diesel Engine Exhaust	NA								
				2.00E-03	P	2.00E-04	P			1	0.1		1.36E+09		Diethanolamine	111-42-2					4.70E+02	1.70E+03	8.50E+05	3.70E+02
				3.00E-02	P	1.00E-04	P			1	0.1		1.36E+09		Diethylene Glycol Monobutyl Ether	112-34-5					7.00E+03	2.60E+04	4.30E+05	5.50E+03
				6.00E-02	P	3.00E-04	P			1	0.1		1.36E+09		Diethylene Glycol Monoethyl Ether	111-90-0					1.40E+04	5.20E+04	1.30E+06	1.10E+04
				1.00E-03	P					1	0.1		1.36E+09		Diethylformamide	617-84-5					2.30E+02	8.70E+02		1.80E+02
3.50E+02	C	1.00E-01	C							1	0.1		1.36E+09		Diethylstilbestrol	56-53-1	2.00E-01	6.50E-01	3.80E+03	1.50E-01				
				8.00E-02	I					1	0.1		1.36E+09		Difenzoquat	43222-48-6					1.90E+04	7.00E+04		1.50E+04
				2.00E-02	I					1	0.1		1.36E+09		Diflubenzuron	35367-38-5					4.70E+03	1.70E+04		3.70E+03
						4.00E+01	I	V		1		1.43E+03	1.36E+09	1.15E+03	Difluoroethane, 1,1-	75-37-6							1.40E+05	1.40E+05
4.40E-02	C	1.30E-05	C					V		1	0.1		1.36E+09	1.24E+03	Dihydrosafrole	94-58-6	1.60E+03	5.20E+03	2.70E+01	2.60E+01				
						7.00E-01	P	V		1		2.26E+03	1.36E+09	3.06E+03	Diisopropyl Ether	108-20-3							6.70E+03	6.70E+03
				8.00E-02	I			V		1		5.30E+02	1.36E+09	2.87E+04	Diisopropyl Methylphosphonate	1445-75-6					1.90E+04			1.90E+04
				2.00E-02	I					1	0.1		1.36E+09		Dimethipin	55290-64-7					4.70E+03	1.70E+04		3.70E+03
				2.00E-04	I					1	0.1		1.36E+09		Dimethoate	60-51-5					4.70E+01	1.70E+02		3.70E+01
1.60E+00	P									1	0.1		1.36E+09		Dimethoxybenzidine, 3,3'-	119-90-4	4.30E+01	1.40E+02		3.30E+01				
1.70E-03	P			6.00E-02	P					1	0.1		1.36E+09		Dimethyl methylphosphonate	756-79-6	4.10E+04	1.30E+05		3.10E+04	1.40E+04	5.20E+04		1.10E+04
4.60E+00	C	1.30E-03	C							1	0.1		1.36E+09		Dimethylamino azobenzene [p-]	60-11-7	1.50E+01	4.90E+01	2.90E+05	1.20E+01				
5.80E-01	H									1	0.1		1.36E+09		Dimethylaniline HCl, 2,4-	21436-96-4	1.20E+02	3.90E+02		9.20E+01				
2.00E-01	P			2.00E-03	X					1	0.1		1.36E+09		Dimethylaniline, 2,4-	95-68-1	3.50E+02	1.10E+03		2.70E+02	4.70E+02	1.70E+03		3.70E+02
				2.00E-03	I			V		1		8.30E+02	1.36E+09	3.13E+04	Dimethylaniline, N,N-	121-69-7					4.70E+02			4.70E+02
1.10E+01	P									1	0.1		1.36E+09		Dimethylbenzidine, 3,3'-	119-93-7	6.30E+00	2.10E+01		4.80E+00				
				1.00E-01	P	3.00E-02	I			1	0.1		1.36E+09		Dimethylformamide	68-12-2					2.30E+04	8.70E+04	1.30E+08	1.80E+04
				1.00E-04	X	2.00E-06	X			1	0.1		1.36E+09		Dimethylhydrazine, 1,1-	57-14-7					2.30E+01	8.70E+01	8.50E+03	1.80E+01
5.50E+02	C	1.60E-01	C							1	0.1		1.36E+09		Dimethylhydrazine, 1,2-	540-73-8	1.30E-01	4.10E-01	2.40E+03	9.70E-02				
				2.00E-02	I					1	0.1		1.36E+09		Dimethylphenol, 2,4-	105-67-9					4.70E+03	1.70E+04		3.70E+03
				6.00E-04	I					1	0.1		1.36E+09		Dimethylphenol, 2,6-	576-26-1					1.40E+02	5.20E+02		1.10E+02
				1.00E-03	I					1	0.1		1.36E+09		Dimethylphenol, 3,4-	95-65-8					2.30E+02	8.70E+02		1.80E+02
4.50E-02	C	1.30E-05	C					V		1	0.1	1.09E+03	1.36E+09	1.01E+03	Dimethylvinylchloride	513-37-1	1.50E+03	5.10E+03	2.20E+01	2.10E+01				
				8.00E-05	X					1	0.1		1.36E+09		Dinitro-o-cresol 4,6-	534-52-1					1.90E+01	7.00E+01		1.50E+01
				2.00E-03	I					1	0.1		1.36E+09		Dinitro-o-cyclohexyl Phenol; 4,6-	131-89-5					4.70E+02	1.70E+03		3.70E+02
				1.00E-04	P					1	0.1		1.36E+09		Dinitrobenzene, 1,2-	528-29-0					2.30E+01	8.70E+01		1.80E+01
				1.00E-04	I					1	0.1		1.36E+09		Dinitrobenzene, 1,3-	99-65-0					2.30E+01	8.70E+01		1.80E+01
				1.00E-04	P					1	0.1		1.36E+09		Dinitrobenzene, 1,4-	100-25-4					2.30E+01	8.70E+01		1.80E+01
				2.00E-03	I					1	0.1		1.36E+09		Dinitrophenol, 2,4-	51-28-5					4.70E+02	1.70E+03		3.70E+02
6.80E-01	I									1	0.1		1.36E+09		Dinitrotoluene Mixture, 2,4/2,6-	NA	1.00E+02	3.30E+02		7.80E+01				
3.10E-01	C	8.90E-05	C	2.00E-03	I					1	0.102		1.36E+09		Dinitrotoluene, 2,4-	121-14-2	2.20E+02	7.20E+02	4.30E+06	1.70E+02	4.70E+02	1.70E+03		3.70E+02
1.50E+00	P			3.00E-04	X					1	0.099		1.36E+09		Dinitrotoluene, 2,6-	606-20-2	4.60E+01	1.50E+02		3.60E+01	7.00E+01	2.60E+02		5.60E+01
				2.00E-03	S					1	0.006		1.36E+09		Dinitrotoluene, 2-Amino-4,6-	35572-78-2					4.70E+02	2.90E+04		4.60E+02
				2.00E-03	S					1	0.009		1.36E+09		Dinitrotoluene, 4-Amino-2,6-	19406-51-0					4.70E+02	1.90E+04		4.60E+02
4.50E-01	X			9.00E-04	X					1	0.1		1.36E+09		Dinitrotoluene, Technical grade	25321-14-6	1.50E+02	5.10E+02		1.20E+02	2.10E+02	7.90E+02		1.70E+02
				1.00E-03	I					1	0.1		1.36E+09		Dinoseb	88-85-7					2.30E+02	8.70E+02		1.80E+02
1.00E-01	I	5.00E-06	I	3.00E-02	I	3.00E-02	I			1	0.1		1.36E+09		Dioxane, 1,4-	123-91-1	7.00E+02	2.30E+03	7.60E+07	5.30E+02	7.00E+03	2.60E+04	1.30E+08	5.50E+03
															Dioxins									
6.20E+03	I	1.30E+00	I							1	0.03		1.36E+09		~Hexachlorodibenzo-p-dioxin, Mixture	NA	1.10E-02	1.20E-01	2.90E+02	1.00E-02				
1.30E+05	C	3.80E+01	C	7.00E-10	I	4.00E-08	C			1	0.03		1.36E+09		~TCDD, 2,3,7,8-	1746-01-6	5.30E-04	5.80E-03	1.00E+01	4.90E-04	1.60E-04	2.00E-03	1.70E+02	1.50E-04
				3.00E-02	I					1	0.1		1.36E+09		Diphenamid	957-51-7					7.00E+03	2.60E+04		5.50E+03
				8.00E-04	X					1	0.1		1.36E+09		Diphenyl Sulfone	127-63-9					1.90E+02	7.00E+02		1.50E+02
				2.50E-02	I					1	0.1		1.36E+09		Diphenylamine	122-39-4					5.90E+03	2.20E+04		4.60E+03
8.00E-01	I	2.20E-04	I							1	0.1		1.36E+09		Diphenylhydrazine, 1,2-	122-66-7	8.70E+01	2.80E+02	1.70E+06	6.70E+01				
				2.20E-03	I					1	0.1		1.36E+09		Diquat	85-00-7					5.20E+02	1.90E+03		4.10E+02
7.10E+00	C	1.40E-01	C							1	0.1		1.36E+09		Direct Black 38	1937-37-7	9.80E+00	3.20E+01	2.70E+03	7.50E+00				
7.40E+00	C	1.40E-01	C							1	0.1		1.36E+09		Direct Blue 6	2602-46-2	9.40E+00	3.10E+01	2.70E+03	7.20E+00				
6.70E+00	C	1.40E-01	C							1	0.1		1.36E+09		Direct Brown 95	16071-86-6	1.00E+01	3.40E+01	2.70E+03	7.90E+00				
				4.00E-05	I					1	0.1		1.36E+09		Disulfoton	298-04-4					9.40E+00	3.50E+01		7.40E+00
				1.00E-02	I			V		1	0.1		1.36E+09	4.25E+04	Dithiane, 1,4-	505-29-3					2.30E+03	8.70E+03		1.80E+03
				2.00E-03	I					1	0.1		1.36E+09		Diuron	330-54-1					4.70E+02	1.70E+03		3.70E+02
				4.00E-03	I					1	0.1		1.36E+09		Dodine	2439-10-3					9.40E+02	3.50E+03		7.40E+02
				2.50E-02	I			V		1			1.36E+09	1.17E+05	EPTC	759-94-4					5.90E+03			5.90E+03
				6.00E-03	I					1	0.1		1.36E+09		Endosulfan	115-29-7					1.40E+03	5.20E+03		1.10E+03
				2.00E-02	I					1	0.1		1.36E+09		Endothall	145-73-3					4.70E+03	1.70E+04		3.70E+03
				3.00E-04	I					1	0.1		1.36E+09		Endrin	72-20-8					7.00E+01	2.60E+02		5.50E+01
9.90E-03	I	1.20E-06	I	6.00E-03	P	1.00E-03	I	V		1		1.05E+04	1.36E+09	1.89E+04	Epichlorohydrin	106-89-8	7.00E+03		4.40E+03	2.70E+03	1.40E+03		5.90E+01	5.70E+01
						2.00E-02	I	V		1		1.53E+04	1.36E+09	7.66E+03	Epoxybutane, 1,2-	106-88-7							4.80E+02	4.80E+02

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #27); H = HEAST; J = New Jersey; O = EPA Office of Water; F = See FAQ; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	volc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
				5.00E-03	I					1	0.1		1.36E+09		Ethephon	16672-87-0					1.20E+03	4.40E+03		9.20E+02
				5.00E-04	I					1	0.1		1.36E+09		Ethion	563-12-2					1.20E+02	4.40E+02		9.20E+01
				1.00E-01	P	6.00E-02	P			1	0.1		1.36E+09		Ethoxyethanol Acetate, 2-	111-15-9					2.30E+04	8.70E+04	2.60E+08	1.80E+04
				9.00E-02	P	2.00E-01	I			1	0.1		1.36E+09		Ethoxyethanol, 2-	110-80-5					2.10E+04	7.90E+04	8.50E+08	1.70E+04
				9.00E-01	I	7.00E-02	P	V		1		1.08E+04	1.36E+09	8.62E+03	Ethyl Acetate	141-78-6					2.10E+05		1.90E+03	1.90E+03
4.80E-02	H			5.00E-03	P	8.00E-03	P	V		1		2.50E+03	1.36E+09	6.34E+03	Ethyl Acrylate	140-88-5	1.40E+03			1.40E+03	1.20E+03		1.60E+02	1.40E+02
						1.00E+01	I	V		1		2.12E+03	1.36E+09	1.29E+03	Ethyl Chloride (Chloroethane)	75-00-3							4.10E+04	4.10E+04
				2.00E-01	I			V		1		1.01E+04	1.36E+09	3.12E+03	Ethyl Ether	60-29-7					4.70E+04			4.70E+04
				9.00E-02	H	3.00E-01	P	V		1		1.10E+03	1.36E+09	5.77E+03	Ethyl Methacrylate	97-63-2					2.10E+04		5.40E+03	4.30E+03
				1.00E-05	I					1	0.1		1.36E+09		Ethyl-p-nitrophenyl Phosphonate	2104-64-5					2.30E+00	8.70E+00		1.80E+00
1.10E-02	C	2.50E-06	C	1.00E-01	I	1.00E+00	I	V		1		4.80E+02	1.36E+09	5.67E+03	Ethylbenzene	100-41-4	6.30E+03		6.40E+02	5.80E+02	2.30E+04		1.80E+04	1.00E+04
				7.00E-02	P					1	0.1		1.36E+09		Ethylene Cyanohydrin	109-78-4					1.60E+04	6.10E+04		1.30E+04
				9.00E-02	P					1	0.1		1.36E+09		Ethylene Diamine	107-15-3					2.10E+04	7.90E+04		1.70E+04
				2.00E+00	I	4.00E-01	C			1	0.1		1.36E+09		Ethylene Glycol	107-21-1					4.70E+05	1.70E+06	1.70E+09	3.70E+05
				1.00E-01	I	1.60E+00	I			1	0.1		1.36E+09		Ethylene Glycol Monobutyl Ether	111-76-2					2.30E+04	8.70E+04	6.80E+09	1.80E+04
3.10E-01	C	8.80E-05	C			3.00E-02	C	V		1		1.21E+05	1.36E+09	6.09E+03	Ethylene Oxide	75-21-8	2.20E+02		1.90E+01	1.80E+01			5.70E+02	5.70E+02
4.50E-02	C	1.30E-05	C	8.00E-05	I					1	0.1		1.36E+09		Ethylene Thiourea	96-45-7	1.50E+03	5.10E+03	2.90E+07	1.20E+03	1.90E+01	7.00E+01		1.50E+01
6.50E+01	C	1.90E-02	C					V		1	0.1	1.54E+05	1.36E+09	2.39E+04	Ethyleneimine	151-56-4	1.10E+00	3.50E+00	3.50E-01	2.50E-01				
				3.00E+00	I					1	0.1		1.36E+09		Ethylphthalyl Ethyl Glycolate	84-72-0					7.00E+05	2.60E+06		5.50E+05
				8.00E-03	I					1	0.1		1.36E+09		Express	101200-48-0					1.90E+03	7.00E+03		1.50E+03
				2.50E-04	I					1	0.1		1.36E+09		Fenamiphos	22224-92-6					5.90E+01	2.20E+02		4.60E+01
				2.50E-02	I					1	0.1		1.36E+09		Fenpropathrin	39515-41-8					5.90E+03	2.20E+04		4.60E+03
				1.30E-02	I					1	0.1		1.36E+09		Fluometuron	2164-17-2					3.10E+03	1.10E+04		2.40E+03
				4.00E-02	C	1.30E-02	C			1			1.36E+09		Fluoride	16984-48-8					9.40E+03		5.50E+07	9.40E+03
				6.00E-02	I	1.30E-02	C			1			1.36E+09		Fluorine (Soluble Fluoride)	7782-41-4					1.40E+04		5.50E+07	1.40E+04
				8.00E-02	I					1	0.1		1.36E+09		Fluridone	59756-60-4					1.90E+04	7.00E+04		1.50E+04
				2.00E-02	I					1	0.1		1.36E+09		Flurprimidol	56425-91-3					4.70E+03	1.70E+04		3.70E+03
				6.00E-02	I					1	0.1		1.36E+09		Flutolanil	66332-96-5					1.40E+04	5.20E+04		1.10E+04
				1.00E-02	I					1	0.1		1.36E+09		Fluvalinate	69409-94-5					2.30E+03	8.70E+03		1.80E+03
3.50E-03	I			1.00E-01	I					1	0.1		1.36E+09		Folpet	133-07-3	2.00E+04	6.50E+04		1.50E+04	2.30E+04	8.70E+04		1.80E+04
1.90E-01	I									1	0.1		1.36E+09		Fomesafen	72178-02-0	3.70E+02	1.20E+03		2.80E+02				
				2.00E-03	I					1	0.1		1.36E+09		Fonofos	944-22-9					4.70E+02	1.70E+03		3.70E+02
		1.30E-05	I	2.00E-01	I	9.80E-03	A			1	0.1		1.36E+09		Formaldehyde	50-00-0			2.90E+07	2.90E+07	4.70E+04	1.70E+05	4.20E+07	3.70E+04
				9.00E-01	P	3.00E-04	X			1	0.1		1.36E+09		Formic Acid	64-18-6					2.10E+05	7.90E+05	1.30E+06	1.50E+05
				3.00E+00	I					1	0.1		1.36E+09		Fosetyl-AL	39148-24-8					7.00E+05	2.60E+06		5.50E+05
															Furans									
				1.00E-03	X			V		1	0.03		1.36E+09	1.96E+05	~Dibenzofuran	132-64-9					2.30E+02	2.90E+03		2.20E+02
				1.00E-03	I			V		1	0.03	6.22E+03	1.36E+09	2.62E+03	~Furan	110-00-9					2.30E+02	2.90E+03		2.20E+02
				9.00E-01	I	2.00E+00	I	V		1	0.03	1.65E+05	1.36E+09	1.22E+04	~Tetrahydrofuran	109-99-9					2.10E+05	2.60E+06	7.60E+04	5.50E+04
3.80E+00	H									1	0.1		1.36E+09		Furazolidone	67-45-8	1.80E+01	6.00E+01		1.40E+01				
				3.00E-03	I	5.00E-02	H			1	0.1		1.36E+09		Furfural	98-01-1					7.00E+02	2.60E+03	2.10E+08	5.50E+02
1.50E+00	C	4.30E-04	C							1	0.1		1.36E+09		Furium	531-82-8	4.60E+01	1.50E+02	8.90E+05	3.60E+01				
3.00E-02	I	8.60E-06	C							1	0.1		1.36E+09		Furmecyclox	60568-05-0	2.30E+03	7.60E+03	4.40E+07	1.80E+03				
				4.00E-04	I					1	0.1		1.36E+09		Glufosinate, Ammonium	77182-82-2					9.40E+01	3.50E+02		7.40E+01
						8.00E-05	C			1	0.1		1.36E+09		Glutaraldehyde	111-30-8							3.40E+05	3.40E+05
				4.00E-04	I	1.00E-03	H			1	0.1		1.36E+09		Glycidyl	765-34-4					9.40E+01	3.50E+02	4.30E+06	7.40E+01
				1.00E-01	I					1	0.1		1.36E+09		Glyphosate	1071-83-6					2.30E+04	8.70E+04		1.80E+04
				3.00E-03	I					1	0.1		1.36E+09		Goal	42874-03-3					7.00E+02	2.60E+03		5.50E+02
				1.00E-02	X					1	0.1		1.36E+09		Guanidine	113-00-8					2.30E+03	8.70E+03		1.80E+03
				2.00E-02	P					1	0.1		1.36E+09		Guanidine Chloride	50-01-1					4.70E+03	1.70E+04		3.70E+03
				3.00E-03	A	1.00E-02	A			1	0.1		1.36E+09		Guthion	86-50-0					7.00E+02	2.60E+03	4.30E+07	5.50E+02
				5.00E-05	I					1	0.1		1.36E+09		Haloxyfop, Methyl	69806-40-2					1.20E+01	4.40E+01		9.20E+00
				1.30E-02	I					1	0.1		1.36E+09		Harmony	79277-27-3					3.10E+03	1.10E+04		2.40E+03
4.50E+00	I	1.30E-03	I	5.00E-04	I					1	0.1		1.36E+09		Heptachlor	76-44-8	1.50E+01	5.10E+01	2.90E+05	1.20E+01	1.20E+02	4.40E+02		9.20E+01
9.10E+00	I	2.60E-03	I	1.30E-05	I					1	0.1		1.36E+09		Heptachlor Epoxide	1024-57-3	7.60E+00	2.50E+01	1.50E+05	5.90E+00	3.10E+00	1.10E+01		2.40E+00
				2.00E-03	I					1	0.1		1.36E+09		Hexabromobenzene	87-82-1					4.70E+02	1.70E+03		3.70E+02
				2.00E-04	I					1	0.1		1.36E+09		Hexabromodiphenyl ether, 2,2',4,4',5,5'- (BDE-153)	68631-49-2					4.70E+01	1.70E+02		3.70E+01
1.60E+00	I	4.60E-04	I	8.00E-04	I					1	0.1		1.36E+09		Hexachlorobenzene	118-74-1	4.30E+01	1.40E+02	8.30E+05	3.30E+01	1.90E+02	7.00E+02		1.50E+02
7.80E-02	I	2.20E-05	I	1.00E-03	P					1	0.1		1.36E+09		Hexachlorobutadiene	87-68-3	8.90E+02	2.90E+03	1.70E+07	6.80E+02	2.30E+02	8.70E+02		1.80E+02
6.30E+00	I	1.80E-03	I	8.00E-03	A					1	0.1		1.36E+09		Hexachlorocyclohexane, Alpha-	319-84-6	1.10E+01	3.60E+01	2.10E+05	8.50E+00	1.90E+03	7.00E+03		1.50E+03
1.80E+00	I	5.30E-04	I							1	0.1		1.36E+09		Hexachlorocyclohexane, Beta-	319-85-7	3.90E+01	1.30E+02	7.20E+05	3.00E+01				
1.10E+00	C	3.10E-04	C	3.00E-04	I					1	0.04		1.36E+09		Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	6.30E+01	5.20E+02	1.20E+06	5.60E+01	7.00E+01	6.50E+02		6.40E+01
1.80E+00	I	5.10E-04	I							1	0.1		1.36E+09		Hexachlorocyclohexane, Technical	608-73-1	3.90E+01	1.30E+02	7.50E+05	3.00E+01				
				6.00E-03	I	2.00E-04	I			1	0.1		1.36E+09		Hexachlorocyclopentadiene	77-47-4					1.40E+03	5.20E+03	8.50E+05	1.10E+03
4.00E-02	I	1.10E-05	C	7.00E-04	I	3.00E-02	I			1	0.1		1.36E+09		Hexachloroethane	67-72-1	1.70E+03	5.70E+03	3.50E+07	1.30E+03	1.60E+02	6.10E+02	1.30E+08	1.30E+02
				3.00E-04	I					1	0.1		1.36E+09		Hexachlorophene	70-30-4					7.00E+01	2.60E+02		5.50E+01
1.10E-01	I			3.00E-03	I					1	0.015		1.36E+09		Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	6.30E+02	1.40E+04		6.00E+02	7.00E+02	1.70E+04		6.80E+02
						1.00E-05	I	V		1		5.19E+03	1.36E+09	3.00E+05	Hexamethylene Diisocyanate, 1,6-	822-06-0							9.40E+00	9.40E+00
				4.00E-04	P					1	0.1		1.36E+09		Hexamethylphosphoramide	680-31-9					9.40E+01	3.50E+02		7.40E+01
				6.00E-02	H	7.00E-01	I	V		1		1.41E+02	1.36E+09	8.29E+02	Hexane, N-	110-54-3					1.40E+04		1.80E+03	1.60E+03
				2.00E+00	P					1	0.1		1.36E+09		Hexanedioic Acid	124-04-9					4.70E+05	1.70E+06		3.70E+05
				5.00E-03	I	3.00E-02	I	V		1		3.28E+03	1.36E+09	1.33E+04	Hexanone, 2-	591-78-6					1.20E+03		1.20E+03	6.00E+02
				3.30E-02	I					1	0.1		1.36E+09		Hexazinone	51235-04-2					7.70E+03	2.90E+04		6.10E+03
3.00E+00	I	4.90E-03	I			3.00E-05	P			1			1.36E+09		Hydrazine	302-01-2	2.30E+01		7.80E+04	2.30E+01			1.30E+05	1.30E+05
3.00E+00	I	4.90E-03	I							1			1.36E+09		Hydrazine Sulfate	10034-93-2	2.30E+01		7.80E+04	2.30E+01				

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #27); H = HEAST; J = New Jersey; O = EPA Office of Water; F = See FAQ; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information														Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	volc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
						2.00E-02	I			1			1.36E+09		Hydrogen Chloride	7647-01-0							8.50E+07	8.50E+07
				4.00E-02	C	1.40E-02	C			1			1.36E+09		Hydrogen Fluoride	7664-39-3					9.40E+03		6.00E+07	9.40E+03
						2.00E-03	I			1			1.36E+09		Hydrogen Sulfide	7783-06-4							8.50E+06	8.50E+06
6.00E-02	P			4.00E-02	P					1	0.1		1.36E+09		Hydroquinone	123-31-9	1.20E+03	3.80E+03		8.90E+02	9.40E+03	3.50E+04		7.40E+03
				1.30E-02	I					1	0.1		1.36E+09		Imazalil	35554-44-0					3.10E+03	1.10E+04		2.40E+03
				2.50E-01	I					1	0.1		1.36E+09		Imazaquin	81335-37-7					5.90E+04	2.20E+05		4.60E+04
				1.00E-02	A					1			1.36E+09		Iodine	7553-56-2					2.30E+03			2.30E+03
				4.00E-02	I					1	0.1		1.36E+09		Iprodione	36734-19-7					9.40E+03	3.50E+04		7.40E+03
				7.00E-01	P					1			1.36E+09		Iron	7439-89-6					1.60E+05			1.60E+05
				3.00E-01	I					1	0.1		1.36E+09		Isobutyl Alcohol	78-83-1					7.00E+04	2.60E+05		5.50E+04
9.50E-04	I			2.00E-01	I	2.00E+00	C			1	0.1		1.36E+09		Isophorone	78-59-1	7.30E+04	2.40E+05		5.60E+04	4.70E+04	1.70E+05	8.50E+09	3.70E+04
				1.50E-02	I					1	0.1		1.36E+09		Isopropalin	33820-53-0					3.50E+03	1.30E+04		2.80E+03
				2.00E+00	P	2.00E-01	P			1	0.1		1.36E+09		Isopropanol	67-63-0					4.70E+05	1.70E+06	8.50E+08	3.70E+05
				1.00E-01	I					1	0.1		1.36E+09		Isopropyl Methyl Phosphonic Acid	1832-54-8					2.30E+04	8.70E+04		1.80E+04
				5.00E-02	I					1	0.1		1.36E+09		Isoxaben	82558-50-7					1.20E+04	4.40E+04		9.20E+03
						3.00E-01	A	V		1			1.36E+09		JP-7	NA							1.30E+09	1.30E+09
				7.50E-02	I					1	0.1		1.36E+09		Kerb	23950-58-5					1.80E+04	6.50E+04		1.40E+04
				2.00E-03	I					1	0.1		1.36E+09		Lactofen	77501-63-4					4.70E+02	1.70E+03		3.70E+02
															Lead Compounds									
5.00E-01	C	1.50E-01	C	2.00E-02	C	2.00E-04	C		M	0.025			1.36E+09		~Lead Chromate	7758-97-6	3.10E+01		9.20E+02	3.00E+01	4.70E+03		8.50E+05	4.70E+03
8.50E-03	C	1.20E-05	C							1			1.36E+09		~Lead Phosphate	7446-27-7	8.20E+03		3.20E+07	8.20E+03				
2.80E-01	C	8.00E-05	C							1	0.1		1.36E+09		~Lead acetate	301-04-2	2.50E+02	8.10E+02	4.80E+06	1.90E+02				
										1			1.36E+09		~Lead and Compounds	7439-92-1								4.00E+02
8.50E-03	C	1.20E-05	C							1	0.1		1.36E+09		~Lead subacetate	1335-32-6	8.20E+03	2.70E+04	3.20E+07	6.30E+03				
				1.00E-07	I					1	0.1		1.36E+09		~Tetraethyl Lead	78-00-2					2.30E-02	8.70E-02		1.80E-02
				2.00E-03	I					1	0.1		1.36E+09		Linuron	330-55-2					4.70E+02	1.70E+03		3.70E+02
				2.00E-03	P					1			1.36E+09		Lithium	7439-93-2					4.70E+02			4.70E+02
				2.00E-01	I					1	0.1		1.36E+09		Londax	83055-99-6					4.70E+04	1.70E+05		3.70E+04
				5.00E-04	I					1	0.1		1.36E+09		MCPA	94-74-6					1.20E+02	4.40E+02		9.20E+01
				1.00E-02	I					1	0.1		1.36E+09		MCPB	94-81-5					2.30E+03	8.70E+03		1.80E+03
				1.00E-03	I					1	0.1		1.36E+09		MCPP	93-65-2					2.30E+02	8.70E+02		1.80E+02
				2.00E-02	I					1	0.1		1.36E+09		Malathion	121-75-5					4.70E+03	1.70E+04		3.70E+03
				1.00E-01	I	7.00E-04	C			1	0.1		1.36E+09		Maleic Anhydride	108-31-6					2.30E+04	8.70E+04	3.00E+06	1.80E+04
				5.00E-01	I					1	0.1		1.36E+09		Maleic Hydrazide	123-33-1					1.20E+05	4.40E+05		9.20E+04
				1.00E-04	P					1	0.1		1.36E+09		Malononitrile	109-77-3					2.30E+01	8.70E+01		1.80E+01
				3.00E-02	H					1	0.1		1.36E+09		Mancozeb	8018-01-7					7.00E+03	2.60E+04		5.50E+03
				5.00E-03	I					1	0.1		1.36E+09		Maneb	12427-38-2					1.20E+03	4.40E+03		9.20E+02
				1.40E-01	I	5.00E-05	I			1					Manganese (Diet)	7439-96-5								
				2.40E-02	S	5.00E-05	I			0.04			1.36E+09		Manganese (Non-diet)	7439-96-5					5.60E+03		2.10E+05	5.50E+03
				9.00E-05	H					1	0.1		1.36E+09		Mephosfolan	950-10-7					2.10E+01	7.90E+01		1.70E+01
				3.00E-02	I					1	0.1		1.36E+09		Mepiquat Chloride	24307-26-4					7.00E+03	2.60E+04		5.50E+03
															Mercury Compounds									
				3.00E-04	I	3.00E-04	S			0.07			1.36E+09		~Mercuric Chloride (and other Mercury salts)	7487-94-7					7.00E+01		1.30E+06	7.00E+01
						3.00E-04	I	V		1		3.13E+00	1.36E+09	3.01E+04	~Mercury (elemental)	7439-97-6							2.80E+01	2.80E+01
				1.00E-04	I					1			1.36E+09		~Methyl Mercury	22967-92-6					2.30E+01			2.30E+01
				8.00E-05	I					1	0.1		1.36E+09		~Phenylmercuric Acetate	62-38-4					1.90E+01	7.00E+01		1.50E+01
				3.00E-05	I					1	0.1		1.36E+09		Merphos	150-50-5					7.00E+00	2.60E+01		5.50E+00
				3.00E-05	I					1	0.1		1.36E+09		Merphos Oxide	78-48-8					7.00E+00	2.60E+01		5.50E+00
				6.00E-02	I					1	0.1		1.36E+09		Metalaxyl	57837-19-1					1.40E+04	5.20E+04		1.10E+04
				1.00E-04	I	3.00E-02	P	V		1		4.58E+03	1.36E+09	6.79E+03	Methacrylonitrile	126-98-7					2.30E+01		6.40E+02	2.30E+01
				5.00E-05	I					1	0.1		1.36E+09		Methamidophos	10265-92-6					1.20E+01	4.40E+01		9.20E+00
				2.00E+00	I	2.00E+01	I			1	0.1		1.36E+09		Methanol	67-56-1					4.70E+05	1.70E+06	8.50E+10	3.70E+05
				1.00E-03	I					1	0.1		1.36E+09		Methidathion	950-37-8					2.30E+02	8.70E+02		1.80E+02
				2.50E-02	I					1	0.1		1.36E+09		Methomyl	16752-77-5					5.90E+03	2.20E+04		4.60E+03
4.90E-02	C	1.40E-05	C							1	0.1		1.36E+09		Methoxy-5-nitroaniline, 2-	99-59-2	1.40E+03	4.60E+03	2.70E+07	1.10E+03				
				5.00E-03	I					1	0.1		1.36E+09		Methoxychlor	72-43-5					1.20E+03	4.40E+03		9.20E+02
				8.00E-03	P	1.00E-03	P			1	0.1		1.36E+09		Methoxyethanol Acetate, 2-	110-49-6					1.90E+03	7.00E+03	4.30E+06	1.50E+03
				5.00E-03	P	2.00E-02	I			1	0.1		1.36E+09		Methoxyethanol, 2-	109-86-4					1.20E+03	4.40E+03	8.50E+07	9.20E+02
				1.00E+00	X			V		1		2.90E+04	1.36E+09	8.12E+03	Methyl Acetate	79-20-9					2.30E+05			2.30E+05
				3.00E-02	H	2.00E-02	P	V		1		6.75E+03	1.36E+09	6.97E+03	Methyl Acrylate	96-33-3					7.00E+03		4.40E+02	4.10E+02
				6.00E-01	I	5.00E+00	I	V		1		2.84E+04	1.36E+09	1.22E+04	Methyl Ethyl Ketone (2-Butanone)	78-93-3					1.40E+05		1.90E+05	8.10E+04
		1.00E-03	X	1.00E-03	P	2.00E-05	X			1	0.1		1.36E+09		Methyl Hydrazine	60-34-4			3.80E+05	3.80E+05	2.30E+02	8.70E+02	8.50E+04	1.80E+02
				8.00E-02	H	3.00E+00	I	V		1		3.36E+03	1.36E+09	1.06E+04	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1					1.90E+04		9.90E+04	1.60E+04
						1.00E-03	C	V		1	0.1	1.67E+04	1.36E+09	4.42E+03	Methyl Isocyanate	624-83-9							1.40E+01	1.40E+01
				1.40E+00	I	7.00E-01	I	V		1		2.36E+03	1.36E+09	6.33E+03	Methyl Methacrylate	80-62-6					3.30E+05		1.40E+04	1.30E+04
				2.50E-04	I					1	0.1		1.36E+09		Methyl Parathion	298-00-0					5.90E+01	2.20E+02		4.60E+01
				6.00E-02	X					1	0.1		1.36E+09		Methyl Phosphonic Acid	993-13-5					1.40E+04	5.20E+04		1.10E+04
				6.00E-03	H	4.00E-02	H	V		1		3.93E+02	1.36E+09	1.07E+04	Methyl Styrene (Mixed Isomers)	25013-15-4					1.40E+03		1.30E+03	6.80E+02
9.90E-02	C	2.80E-05	C							1	0.1		1.36E+09		Methyl methanesulfonate	66-27-3	7.00E+02	2.30E+03	1.40E+07	5.40E+02				
1.80E-03	C	2.60E-07	C			3.00E+00	I	V		1		8.87E+03	1.36E+09	4.90E+03	Methyl tert-Butyl Ether (MTBE)	1634-04-4	3.90E+04		5.30E+03	4.70E+03			4.60E+04	4.60E+04
				3.00E-04	X					1	0.1		1.36E+09		Methyl-1,4-benzenediamine dihydrochloride, 2-	615-45-2					7.00E+01	2.60E+02		5.50E+01
9.00E-03	P			2.00E-02	X					1	0.1		1.36E+09		Methyl-5-Nitroaniline, 2-	99-55-8	7.70E+03	2.50E+04		5.90E+03	4.70E+03	1.70E+04		3.70E+03
8.30E+00	C	2.40E-03	C							1	0.1		1.36E+09		Methyl-N-nitro-N-nitrosoguanidine, N-	70-25-7	8.40E+00	2.70E+01	1.60E+05	6.40E+00				
1.30E-01	C	3.70E-05	C							1	0.1		1.36E+09		Methylaniline Hydrochloride, 2-	636-21-5	5.30E+02	1.80E+03	1.00E+07	4.10E+02				
				1.00E-02	A					1	0.1		1.36E+09		Methylarsonic acid	124-58-3					2.30E+03	8.70E+03		1.80E+03

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Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
				2.00E-04	X					1	0.1		1.36E+09		Methylbenzene,1-4-diamine monohydrochloride, 2-	74612-12-7					4.70E+01	1.70E+02		3.70E+01
1.00E-01	X			3.00E-04	X					1	0.1		1.36E+09		Methylbenzene-1,4-diamine sulfate, 2-	615-50-9	7.00E+02	2.30E+03		5.30E+02	7.00E+01	2.60E+02		5.50E+01
2.20E+01	C	6.30E-03	C						M	1	0.1		1.36E+09		Methylcholanthrene, 3-	56-49-5	7.00E-01	2.40E+00	2.20E+04	5.40E-01				
2.00E-03	I	1.00E-08	I	6.00E-03	I	6.00E-01	I	V	M	1		3.32E+03	1.36E+09	2.19E+03	Methylene Chloride	75-09-2	7.70E+03		2.20E+04	5.70E+03	1.40E+03		4.10E+03	1.00E+03
1.00E-01	P	4.30E-04	C	2.00E-03	P				M	1	0.1		1.36E+09		Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	1.50E+02	5.40E+02	3.20E+05	1.20E+02	4.70E+02	1.70E+03		3.70E+02
4.60E-02	I	1.30E-05	C							1	0.1		1.36E+09		Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	1.50E+03	4.90E+03	2.90E+07	1.20E+03				
1.60E+00	C	4.60E-04	C			2.00E-02	C			1	0.1		1.36E+09		Methylenebisbenzenamine, 4,4'-	101-77-9	4.30E+01	1.40E+02	8.30E+05	3.30E+01			8.50E+07	8.50E+07
						6.00E-04	I			1	0.1		1.36E+09		Methylenediphenyl Diisocyanate	101-68-8							2.60E+06	2.60E+06
				7.00E-02	H			V		1		5.00E+02	1.36E+09	1.28E+04	Methylstyrene, Alpha-	98-83-9					1.60E+04			1.60E+04
				1.50E-01	I					1	0.1		1.36E+09		Metolachlor	51218-45-2					3.50E+04	1.30E+05		2.80E+04
				2.50E-02	I					1	0.1		1.36E+09		Metribuzin	21087-64-9					5.90E+03	2.20E+04		4.60E+03
				3.00E+00	P			V		1	0.1	3.42E-01	1.36E+09	1.06E+03	Mineral oils	8012-95-1					7.00E+05	2.60E+06		5.50E+05
1.80E+01	C	5.10E-03	C	2.00E-04	I					1	0.1		1.36E+09		Mirex	2385-85-5	3.90E+00	1.30E+01	7.50E+04	3.00E+00	4.70E+01	1.70E+02		3.70E+01
				2.00E-03	I					1	0.1		1.36E+09		Molinate	2212-67-1					4.70E+02	1.70E+03		3.70E+02
				5.00E-03	I					1			1.36E+09		Molybdenum	7439-98-7					1.20E+03			1.20E+03
				1.00E-01	I					1			1.36E+09		Monochloramine	10599-90-3					2.30E+04			2.30E+04
				2.00E-03	P					1	0.1		1.36E+09		Monomethylaniline	100-61-8					4.70E+02	1.70E+03		3.70E+02
				3.00E-04	X					1	0.1		1.36E+09		N,N'-Diphenyl-1,4-benzenediamine	74-31-7					7.00E+01	2.60E+02		5.50E+01
				2.00E-03	I					1	0.1		1.36E+09		Naled	300-76-5					4.70E+02	1.70E+03		3.70E+02
				3.00E-02	X	1.00E-01	P	V		1			1.36E+09		Naphtha, High Flash Aromatic (HFAN)	64742-95-6					7.00E+03		4.30E+08	7.00E+03
1.80E+00	C	0.00E+00	C							1	0.1		1.36E+09		Naphthylamine, 2-	91-59-8	3.90E+01	1.30E+02		3.00E+01				
				1.00E-01	I					1	0.1		1.36E+09		Napropamide	15299-99-7					2.30E+04	8.70E+04		1.80E+04
		2.60E-04	C	1.10E-02	C	1.40E-05	C			0.04			1.36E+09		Nickel Acetate	373-02-4			1.50E+06	1.50E+06	2.60E+03		6.00E+04	2.50E+03
		2.60E-04	C	1.10E-02	C	1.40E-05	C			0.04			1.36E+09		Nickel Carbonate	3333-67-3			1.50E+06	1.50E+06	2.60E+03		6.00E+04	2.50E+03
		2.60E-04	C	1.10E-02	C	1.40E-05	C			0.04			1.36E+09		Nickel Carbonyl	13463-39-3			1.50E+06	1.50E+06	2.60E+03		6.00E+04	2.50E+03
		2.60E-04	C	1.10E-02	C	1.40E-05	C			0.04			1.36E+09		Nickel Hydroxide	12054-48-7			1.50E+06	1.50E+06	2.60E+03		6.00E+04	2.50E+03
		2.60E-04	C	1.10E-02	C	2.00E-05	C			0.04			1.36E+09		Nickel Oxide	1313-99-1			1.50E+06	1.50E+06	2.60E+03		8.50E+04	2.50E+03
		2.40E-04	I	1.10E-02	C	1.40E-05	C			0.04			1.36E+09		Nickel Refinery Dust	NA			1.60E+06	1.60E+06	2.60E+03		6.00E+04	2.50E+03
		2.60E-04	C	2.00E-02	I	9.00E-05	A			0.04			1.36E+09		Nickel Soluble Salts	7440-02-0			1.50E+06	1.50E+06	4.70E+03		3.80E+05	4.60E+03
1.70E+00	C	4.80E-04	I	1.10E-02	C	1.40E-05	C			0.04			1.36E+09		Nickel Subsulfide	12035-72-2	4.10E+01		8.00E+05	4.10E+01	2.60E+03		6.00E+04	2.50E+03
		2.60E-04	C	1.10E-02	C	1.40E-05	C			0.04			1.36E+09		Nickelocene	1271-28-9			1.50E+06	1.50E+06	2.60E+03		6.00E+04	2.50E+03
				1.60E+00	I					1			1.36E+09		Nitrate	14797-55-8					3.80E+05			3.80E+05
										1			1.36E+09		Nitrate + Nitrite (as N)	NA								
				1.00E-01	I					1			1.36E+09		Nitrite	14797-65-0					2.30E+04			2.30E+04
				1.00E-02	X	5.00E-05	X			1	0.1		1.36E+09		Nitroaniline, 2-	88-74-4					2.30E+03	8.70E+03	2.10E+05	1.80E+03
2.00E-02	P			4.00E-03	P	6.00E-03	P			1	0.1		1.36E+09		Nitroaniline, 4-	100-01-6	3.50E+03	1.10E+04		2.70E+03	9.40E+02	3.50E+03	2.60E+07	7.40E+02
		4.00E-05	I	2.00E-03	I	9.00E-03	I	V		1		3.05E+03	1.36E+09	7.32E+04	Nitrobenzene	98-95-3			5.10E+02	5.10E+02	4.70E+02		2.10E+03	3.80E+02
				3.00E+03	P					1	0.1		1.36E+09		Nitrocellulose	9004-70-0					7.00E+08	2.60E+09		5.50E+08
				7.00E-02	H					1	0.1		1.36E+09		Nitrofurantoin	67-20-9					1.60E+04	6.10E+04		1.30E+04
1.30E+00	C	3.70E-04	C							1	0.1		1.36E+09		Nitrofurazone	59-87-0	5.30E+01	1.80E+02	1.00E+06	4.10E+01				
1.70E-02	P			1.00E-04	P					1	0.1		1.36E+09		Nitroglycerin	55-63-0	4.10E+03	1.30E+04		3.10E+03	2.30E+01	8.70E+01		1.80E+01
				1.00E-01	I					1	0.1		1.36E+09		Nitroguanidine	556-88-7					2.30E+04	8.70E+04		1.80E+04
		8.80E-06	P			5.00E-03	P	V		1		1.80E+04	1.36E+09	1.69E+04	Nitromethane	75-52-5			5.40E+02	5.40E+02			2.60E+02	2.60E+02
		2.70E-03	H			2.00E-02	I	V		1		4.86E+03	1.36E+09	1.31E+04	Nitropropane, 2-	79-46-9			1.40E+00	1.40E+00			8.20E+02	8.20E+02
2.70E+01	C	7.70E-03	C						M	1	0.1		1.36E+09		Nitroso-N-ethylurea, N-	759-73-9	5.70E-01	2.00E+00	1.80E+04	4.40E-01				
1.20E+02	C	3.40E-02	C						M	1	0.1		1.36E+09		Nitroso-N-methylurea, N-	684-93-5	1.30E-01	4.50E-01	4.10E+03	9.90E-02				
5.40E+00	I	1.60E-03	I					V		1			1.36E+09	1.97E+05	Nitroso-di-N-butylamine, N-	924-16-3	1.30E+01		3.50E+01	9.40E+00				
7.00E+00	I	2.00E-03	C							1	0.1		1.36E+09		Nitroso-di-N-propylamine, N-	621-64-7	9.90E+00	3.30E+01	1.90E+05	7.60E+00				
2.80E+00	I	8.00E-04	C							1	0.1		1.36E+09		Nitrosodiethanolamine, N-	1116-54-7	2.50E+01	8.10E+01	4.80E+05	1.90E+01				
1.50E+02	I	4.30E-02	I						M	1	0.1		1.36E+09		Nitrosodiethylamine, N-	55-18-5	1.00E-01	3.60E-01	3.20E+03	7.90E-02				
5.10E+01	I	1.40E-02	I	8.00E-06	P	4.00E-05	X		M	1	0.1		1.36E+09		Nitrosodimethylamine, N-	62-75-9	3.00E-01	1.10E+00	9.80E+03	2.30E-01	1.90E+00	7.00E+00	1.70E+05	1.50E+00
4.90E-03	I	2.60E-06	C							1	0.1		1.36E+09		Nitrosodiphenylamine, N-	86-30-6	1.40E+04	4.60E+04	1.50E+08	1.10E+04				
2.20E+01	I	6.30E-03	C							1	0.1		1.36E+09		Nitrosomethylethylamine, N-	10595-95-6	3.20E+00	1.00E+01	6.10E+04	2.40E+00				
6.70E+00	C	1.90E-03	C							1	0.1		1.36E+09		Nitrosomorpholine [N-]	59-89-2	1.00E+01	3.40E+01	2.00E+05	7.90E+00				
9.40E+00	C	2.70E-03	C							1	0.1		1.36E+09		Nitrosopiperidine [N-]	100-75-4	7.40E+00	2.40E+01	1.40E+05	5.70E+00				
2.10E+00	I	6.10E-04	I							1	0.1		1.36E+09		Nitrosopyrrolidine, N-	930-55-2	3.30E+01	1.10E+02	6.30E+05	2.50E+01				
				1.00E-04	X					1	0.1		1.36E+09		Nitrotoluene, m-	99-08-1					2.30E+01	8.70E+01		1.80E+01
2.20E-01	P			9.00E-04	P			V		1		1.51E+03	1.36E+09	1.37E+05	Nitrotoluene, o-	88-72-2	3.20E+02			3.20E+02	2.10E+02			2.10E+02
1.60E-02	P			4.00E-03	P					1	0.1		1.36E+09		Nitrotoluene, p-	99-99-0	4.30E+03	1.40E+04		3.30E+03	9.40E+02	3.50E+03		7.40E+02
				3.00E-04	X	2.00E-02	P	V		1		6.86E+00	1.36E+09	1.04E+03	Nonane, n-	111-84-2					7.00E+01		6.50E+01	3.40E+01
				4.00E-02	I					1	0.1		1.36E+09		Norflurazon	27314-13-2					9.40E+03	3.50E+04		7.40E+03
				7.00E-04	I					1	0.1		1.36E+09		Nustar	85509-19-9					1.60E+02	6.10E+02		1.30E+02
				3.00E-03	I					1	0.1		1.36E+09		Octabromodiphenyl Ether	32536-52-0					7.00E+02	2.60E+03		5.50E+02
				5.00E-02	I					1	0.006		1.36E+09		Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0					1.20E+04	7.30E+05		1.20E+04
				2.00E-03	H					1	0.1		1.36E+09		Octamethylpyrophosphoramide	152-16-9					4.70E+02	1.70E+03		3.70E+02
				5.00E-02	I					1	0.1		1.36E+09		Oryzalin	19044-88-3					1.20E+04	4.40E+04		9.20E+03
				5.00E-03	I					1	0.1		1.36E+09		Oxadiazon	19666-30-9					1.20E+03	4.40E+03		9.20E+02
				2.50E-02	I					1	0.1		1.36E+09		Oxamyl	23135-22-0					5.90E+03	2.20E+04		4.60E+03
				1.30E-02	I					1	0.1		1.36E+09		Paclobutrazol	76738-62-0					3.10E+03	1.10E+04		2.40E+03
				4.50E-03	I					1	0.1		1.36E+09		Paraquat Dichloride	1910-42-5					1.10E+03	3.90E+03		8.30E+02
				6.00E-03	H					1	0.1		1.36E+09		Parathion	56-38-2					1.40E+03	5.20E+03		1.10E+03
				5.00E-02	H					1	0.1		1.36E+09		Pebulate	1114-71-2					1.20E+04	4.40E+04		9.20E+03
				4.00E-02	I					1	0.1		1.36E+09		Pendimethalin	40487-42-1					9.40E+03	3.50E+04		7.40E+03
				2.00E-03	I					1	0.1		1.36E+09		Pentabromodiphenyl Ether	32534-81-9					4.70E+02	1.70E+03		3.70E+02
				1.00E-04	I					1	0.1		1.36E+09		Pentabromodiphenyl ether, 2,2',4,4',5- (BDE-99)	60348-60-9					2.30E+01	8.70E+01		1.80E+01

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Toxicity and Chemical-specific Information															Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
				8.00E-04	I					1	0.1		1.36E+09		Pentachlorobenzene	608-93-5					1.90E+02	7.00E+02		1.50E+02
9.00E-02	P									1	0.1		1.36E+09		Pentachloroethane	76-01-7	7.70E+02	2.50E+03		5.90E+02				
2.60E-01	H			3.00E-03	I					1	0.1		1.36E+09		Pentachloronitrobenzene	82-68-8	2.70E+02	8.80E+02		2.00E+02	7.00E+02	2.60E+03		5.50E+02
4.00E-01	I	5.10E-06	C	5.00E-03	I					1	0.25		1.36E+09		Pentachlorophenol	87-86-5	1.70E+02	2.30E+02	7.50E+07	9.90E+01	1.20E+03	1.70E+03		7.00E+02
4.00E-03	X			2.00E-03	P					1	0.1		1.36E+09		Pentaerythritol tetranitrate (PETN)	78-11-5	1.70E+04	5.70E+04		1.30E+04	4.70E+02	1.70E+03		3.70E+02
						1.00E+00	P	V		1		3.88E+02	1.36E+09	7.79E+02	Pentane, n-	109-66-0							2.40E+03	2.40E+03
															Perchlorates									
				7.00E-04	I					1			1.36E+09		~Ammonium Perchlorate	7790-98-9					1.60E+02			1.60E+02
				7.00E-04	I					1			1.36E+09		~Lithium Perchlorate	7791-03-9					1.60E+02			1.60E+02
				7.00E-04	I					1			1.36E+09		~Perchlorate and Perchlorate Salts	14797-73-0					1.60E+02			1.60E+02
				7.00E-04	I					1			1.36E+09		~Potassium Perchlorate	7778-74-7					1.60E+02			1.60E+02
				7.00E-04	I					1			1.36E+09		~Sodium Perchlorate	7601-89-0					1.60E+02			1.60E+02
				2.00E-02	P					1	0.1		1.36E+09		Perfluorobutane Sulfonate	375-73-5					4.70E+03	1.70E+04		3.70E+03
				5.00E-02	I					1	0.1		1.36E+09		Permethrin	52645-53-1					1.20E+04	4.40E+04		9.20E+03
2.20E-03	C	6.30E-07	C							1	0.1		1.36E+09		Phenacetin	62-44-2	3.20E+04	1.00E+05	6.10E+08	2.40E+04				
				2.50E-01	I					1	0.1		1.36E+09		Phenmedipham	13684-63-4					5.90E+04	2.20E+05		4.60E+04
				3.00E-01	I	2.00E-01	C			1	0.1		1.36E+09		Phenol	108-95-2					7.00E+04	2.60E+05	8.50E+08	5.50E+04
				5.00E-04	X					1	0.1		1.36E+09		Phenothiazine	92-84-2					1.20E+02	4.40E+02		9.20E+01
				6.00E-03	I					1	0.1		1.36E+09		Phenylenediamine, m-	108-45-2					1.40E+03	5.20E+03		1.10E+03
4.70E-02	H									1	0.1		1.36E+09		Phenylenediamine, o-	95-54-5	1.50E+03	4.80E+03		1.10E+03				
				1.90E-01	H					1	0.1		1.36E+09		Phenylenediamine, p-	106-50-3					4.50E+04	1.70E+05		3.50E+04
1.90E-03	H									1	0.1		1.36E+09		Phenylphenol, 2-	90-43-7	3.60E+04	1.20E+05		2.70E+04				
				2.00E-04	H					1	0.1		1.36E+09		Phorate	298-02-2					4.70E+01	1.70E+02		3.70E+01
						3.00E-04	I	V		1		1.61E+03	1.36E+09	9.81E+02	Phosgene	75-44-5							9.20E-01	9.20E-01
				2.00E-02	I					1	0.1		1.36E+09		Phosmet	732-11-6					4.70E+03	1.70E+04		3.70E+03
															Phosphates, Inorganic									
				4.90E+01	P					1			1.36E+09		~Aluminum metaphosphate	13776-88-0					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Ammonium polyphosphate	68333-79-9					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Calcium pyrophosphate	7790-76-3					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Diammonium phosphate	7783-28-0					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Dicalcium phosphate	7757-93-9					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Dimagnesium phosphate	7782-75-4					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Dipotassium phosphate	7758-11-4					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Disodium phosphate	7558-79-4					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Monoaluminum phosphate	13530-50-2					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Monoammonium phosphate	7722-76-1					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Monocalcium phosphate	7758-23-8					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Monomagnesium phosphate	7757-86-0					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Monopotassium phosphate	7778-77-0					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Monosodium phosphate	7558-80-7					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Polyphosphoric acid	8017-16-1					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Potassium tripolyphosphate	13845-36-8					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Sodium acid pyrophosphate	7758-16-9					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Sodium aluminum phosphate (acidic)	7785-88-8					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Sodium aluminum phosphate (anhydrous)	10279-59-1					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Sodium aluminum phosphate (tetrahydrate)	10305-76-7					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Sodium hexametaphosphate	10124-56-8					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Sodium polyphosphate	68915-31-1					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Sodium trimetaphosphate	7785-84-4					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Sodium tripolyphosphate	7758-29-4					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Tetrapotassium phosphate	7320-34-5					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Tetrasodium pyrophosphate	7722-88-5					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Trialuminum sodium tetra decahydrogenoctaorthophosphate (dihydrate)	15136-87-5					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Tricalcium phosphate	7758-87-4					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Trimagnesium phosphate	7757-87-1					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Tripotassium phosphate	7778-53-2					1.10E+07			1.10E+07
				4.90E+01	P					1			1.36E+09		~Trisodium phosphate	7601-54-9					1.10E+07			1.10E+07
				3.00E-04	I	3.00E-04	I			1			1.36E+09		Phosphine	7803-51-2					7.00E+01		1.30E+06	7.00E+01
				4.90E+01	P	1.00E-02	I			1			1.36E+09		Phosphoric Acid	7664-38-2					1.10E+07		4.30E+07	9.00E+06
				2.00E-05	I					1			1.36E+09		Phosphorus, White	7723-14-0					4.70E+00			4.70E+00
															Phthalates									
1.40E-02	I	2.40E-06	C	2.00E-02	I					1	0.1		1.36E+09		~Bis(2-ethylhexyl)phthalate	117-81-7	5.00E+03	1.60E+04	1.60E+08	3.80E+03	4.70E+03	1.70E+04		3.70E+03
				1.00E+00	I					1	0.1		1.36E+09		~Butylphthalyl Butylglycolate	85-70-1					2.30E+05	8.70E+05		1.80E+05
				1.00E-01	I					1	0.1		1.36E+09		~Dibutyl Phthalate	84-74-2					2.30E+04	8.70E+04		1.80E+04
				8.00E-01	I					1	0.1		1.36E+09		~Diethyl Phthalate	84-66-2					1.90E+05	7.00E+05		1.50E+05
				1.00E-01	I			V		1			1.36E+09	2.13E+04	~Dimethylterephthalate	120-61-6					2.30E+04			2.30E+04
				1.00E-02	P					1	0.1		1.36E+09		~Octyl Phthalate, di-N-	117-84-0					2.30E+03	8.70E+03		1.80E+03
				1.00E+00	H					1	0.1		1.36E+09		~Phthalic Acid, P-	100-21-0					2.30E+05	8.70E+05		1.80E+05
				2.00E+00	I	2.00E-02	C			1	0.1		1.36E+09		~Phthalic Anhydride	85-44-9					4.70E+05	1.70E+06	8.50E+07	3.70E+05
				7.00E-02	I					1	0.1		1.36E+09		Picloram	1918-02-1					1.60E+04	6.10E+04		1.30E+04
				1.00E-04	X					1	0.1		1.36E+09		Picramic Acid (2-Amino-4,6-dinitrophenol)	96-91-3					2.30E+01	8.70E+01		1.80E+01
				1.00E-02	I					1	0.1		1.36E+09		Pirimiphos, Methyl	29232-93-7					2.30E+03	8.70E+03		1.80E+03
3.00E+01	C	8.60E-03	C	7.00E-06	H					1	0.1		1.36E+09		Polybrominated Biphenyls	59536-65-1	2.30E+00	7.60E+00	4.40E+04	1.80E+00	1.60E+00	6.10E+00		1.30E+00
															Polychlorinated Biphenyls (PCBs)									
7.00E-02	S	2.00E-05	S	7.00E-05	I					1	0.14		1.36E+09		~Aroclor 1016	12674-11-2	9.90E+02	2.30E+03	1.90E+07	7.00E+02	1.60E+01	4.40E+01		1.20E+01

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #27); H = HEAST; J = New Jersey; O = EPA Office of Water; F = See FAQ; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information														Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	volc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
2.00E+00	S	5.70E-04	S					V		1	0.14	7.57E+02	1.36E+09	8.51E+04	~Aroclor 1221	11104-28-2	3.50E+01	8.10E+01	4.20E+01	1.50E+01				
2.00E+00	S	5.70E-04	S					V		1	0.14	7.32E+01	1.36E+09	8.51E+04	~Aroclor 1232	11141-16-5	3.50E+01	8.10E+01	4.20E+01	1.50E+01				
2.00E+00	S	5.70E-04	S							1	0.14		1.36E+09		~Aroclor 1242	53469-21-9	3.50E+01	8.10E+01	6.70E+05	2.40E+01				
2.00E+00	S	5.70E-04	S							1	0.14		1.36E+09		~Aroclor 1248	12672-29-6	3.50E+01	8.10E+01	6.70E+05	2.40E+01				
2.00E+00	S	5.70E-04	S	2.00E-05	I					1	0.14		1.36E+09		~Aroclor 1254	11097-69-1	3.50E+01	8.10E+01	6.70E+05	2.40E+01	4.70E+00	1.20E+01		3.40E+00
2.00E+00	S	5.70E-04	S							1	0.14		1.36E+09		~Aroclor 1260	11096-82-5	3.50E+01	8.10E+01	6.70E+05	2.40E+01				
				6.00E-04	X					1	0.1		1.36E+09		~Aroclor 5460	11126-42-4					1.40E+02	5.20E+02		1.10E+02
3.90E+00	E	1.10E-03	E	2.30E-05	E	1.30E-03	E			1	0.14		1.36E+09		~Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)	39635-31-9	1.80E+01	4.20E+01	3.30E+05	1.20E+01	5.50E+00	1.50E+01	5.70E+06	4.00E+00
3.90E+00	E	1.10E-03	E	2.30E-05	E	1.30E-03	E			1	0.14		1.36E+09		~Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	1.80E+01	4.20E+01	3.30E+05	1.20E+01	5.50E+00	1.50E+01	5.70E+06	4.00E+00
3.90E+00	E	1.10E-03	E	2.30E-05	E	1.30E-03	E			1	0.14		1.36E+09		~Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)	69782-90-7	1.80E+01	4.20E+01	3.30E+05	1.20E+01	5.50E+00	1.50E+01	5.70E+06	4.00E+00
3.90E+00	E	1.10E-03	E	2.30E-05	E	1.30E-03	E			1	0.14		1.36E+09		~Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)	38380-08-4	1.80E+01	4.20E+01	3.30E+05	1.20E+01	5.50E+00	1.50E+01	5.70E+06	4.00E+00
3.90E+03	E	1.10E+00	E	2.30E-08	E	1.30E-06	E			1	0.14		1.36E+09		~Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	1.80E-02	4.20E-02	3.30E+02	1.20E-02	5.50E-03	1.50E-02	5.70E+03	4.00E-03
3.90E+00	E	1.10E-03	E	2.30E-05	E	1.30E-03	E			1	0.14		1.36E+09		~Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3	1.80E+01	4.20E+01	3.30E+05	1.20E+01	5.50E+00	1.50E+01	5.70E+06	4.00E+00
3.90E+00	E	1.10E-03	E	2.30E-05	E	1.30E-03	E			1	0.14		1.36E+09		~Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	1.80E+01	4.20E+01	3.30E+05	1.20E+01	5.50E+00	1.50E+01	5.70E+06	4.00E+00
3.90E+00	E	1.10E-03	E	2.30E-05	E	1.30E-03	E			1	0.14		1.36E+09		~Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	1.80E+01	4.20E+01	3.30E+05	1.20E+01	5.50E+00	1.50E+01	5.70E+06	4.00E+00
3.90E+00	E	1.10E-03	E	2.30E-05	E	1.30E-03	E			1	0.14		1.36E+09		~Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)	74472-37-0	1.80E+01	4.20E+01	3.30E+05	1.20E+01	5.50E+00	1.50E+01	5.70E+06	4.00E+00
1.30E+04	E	3.80E+00	E	7.00E-09	E	4.00E-07	E			1	0.14		1.36E+09		~Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8	5.30E-03	1.30E-02	1.00E+02	3.70E-03	1.60E-03	4.40E-03	1.70E+03	1.20E-03
2.00E+00	I	5.70E-04	I							1	0.14		1.36E+09		~Polychlorinated Biphenyls (high risk)	1336-36-3	3.50E+01	8.10E+01	6.70E+05	2.40E+01				
4.00E-01	I	1.00E-04	I							1	0.14				~Polychlorinated Biphenyls (low risk)	1336-36-3								
7.00E-02	I	2.00E-05	I							1	0.14				~Polychlorinated Biphenyls (lowest risk)	1336-36-3								
1.30E+01	E	3.80E-03	E	7.00E-06	E	4.00E-04	E			1	0.14		1.36E+09		~Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	5.30E+00	1.30E+01	1.00E+05	3.70E+00	1.60E+00	4.40E+00	1.70E+06	1.20E+00
3.90E+01	E	1.10E-02	E	2.30E-06	E	1.30E-04	E			1	0.14		1.36E+09		~Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4	1.80E+00	4.20E+00	3.30E+04	1.20E+00	5.50E-01	1.50E+00	5.70E+05	4.00E-01
						6.00E-04	I			1	0.1		1.36E+09		Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9							2.60E+06	2.60E+06
															Polynuclear Aromatic Hydrocarbons (PAHs)									
				6.00E-02	I			V		1	0.13		1.36E+09	1.41E+05	~Acenaphthene	83-32-9					1.40E+04	4.00E+04		1.00E+04
				3.00E-01	I			V		1	0.13		1.36E+09	5.23E+05	~Anthracene	120-12-7					7.00E+04	2.00E+05		5.20E+04
7.30E-01	E	1.10E-04	C						M	1	0.13		1.36E+09		~Benz[a]anthracene	56-55-3	2.10E+01	5.70E+01	1.30E+06	1.50E+01				
1.20E+00	C	1.10E-04	C							1	0.13		1.36E+09		~Benzo(j)fluoranthene	205-82-3	5.80E+01	1.50E+02	3.50E+06	4.10E+01				
7.30E+00	I	1.10E-03	C						M	1	0.13		1.36E+09		~Benzo[a]pyrene	50-32-8	2.10E+00	5.70E+00	1.30E+05	1.50E+00				
7.30E-01	E	1.10E-04	C						M	1	0.13		1.36E+09		~Benzo[b]fluoranthene	205-99-2	2.10E+01	5.70E+01	1.30E+06	1.50E+01				
7.30E-02	E	1.10E-04	C						M	1	0.13		1.36E+09		~Benzo[k]fluoranthene	207-08-9	2.10E+02	5.70E+02	1.30E+06	1.50E+02				
				8.00E-02	I			V		1			1.36E+09	7.99E+04	~Chloronaphthalene, Beta-	91-58-7					1.90E+04			1.90E+04
7.30E-03	E	1.10E-05	C						M	1	0.13		1.36E+09		~Chrysene	218-01-9	2.10E+03	5.70E+03	1.30E+07	1.50E+03				
7.30E+00	E	1.20E-03	C						M	1	0.13		1.36E+09		~Dibenz[a,h]anthracene	53-70-3	2.10E+00	5.70E+00	1.10E+05	1.50E+00				
1.20E+01	C	1.10E-03	C							1	0.13		1.36E+09		~Dibenzo(a,e)pyrene	192-65-4	5.80E+00	1.50E+01	3.50E+05	4.10E+00				
2.50E+02	C	7.10E-02	C						M	1	0.13		1.36E+09		~Dimethylbenz(a)anthracene, 7,12-	57-97-6	6.10E-02	1.70E-01	1.90E+03	4.50E-02				
				4.00E-02	I					1	0.13		1.36E+09		~Fluoranthene	206-44-0					9.40E+03	2.70E+04		7.00E+03
				4.00E-02	I			V		1	0.13		1.36E+09	2.81E+05	~Fluorene	86-73-7					9.40E+03	2.70E+04		7.00E+03
7.30E-01	E	1.10E-04	C						M	1	0.13		1.36E+09		~Indeno[1,2,3-cd]pyrene	193-39-5	2.10E+01	5.70E+01	1.30E+06	1.50E+01				
2.90E-02	P			7.00E-02	A			V		1	0.13		1.36E+09	5.86E+04	~Methylnaphthalene, 1-	90-12-0	2.40E+03	6.00E+03		1.70E+03	1.60E+04	4.70E+04		1.20E+04
				4.00E-03	I			V		1	0.13		1.36E+09	5.80E+04	~Methylnaphthalene, 2-	91-57-6					9.40E+02	2.70E+03		7.00E+02
		3.40E-05	C	2.00E-02	I	3.00E-03	I	V		1	0.13		1.36E+09	4.63E+04	~Naphthalene	91-20-3			3.80E+02	3.80E+02	4.70E+03	1.30E+04	4.30E+02	3.90E+02
1.20E+00	C	1.10E-04	C							1	0.13		1.36E+09		~Nitropyrene, 4-	57835-92-4	5.80E+01	1.50E+02	3.50E+06	4.10E+01				
				3.00E-02	I			V		1	0.13		1.36E+09	2.38E+06	~Pyrene	129-00-0					7.00E+03	2.00E+04		5.20E+03
				2.00E-02	P					1	0.1		1.36E+09		Potassium Perfluorobutane Sulfonate	29420-49-3					4.70E+03	1.70E+04		3.70E+03
1.50E-01	I			9.00E-03	I					1	0.1		1.36E+09		Prochloraz	67747-09-5	4.60E+02	1.50E+03		3.60E+02	2.10E+03	7.90E+03		1.70E+03
				6.00E-03	H					1	0.1		1.36E+09		Profluralin	26399-36-0					1.40E+03	5.20E+03		1.10E+03
				1.50E-02	I					1	0.1		1.36E+09		Prometon	1610-18-0					3.50E+03	1.30E+04		2.80E+03
				4.00E-03	I					1	0.1		1.36E+09		Prometryn	7287-19-6					9.40E+02	3.50E+03		7.40E+02
				1.30E-02	I					1	0.1		1.36E+09		Propachlor	1918-16-7					3.10E+03	1.10E+04		2.40E+03
				5.00E-03	I					1	0.1		1.36E+09		Propanil	709-98-8					1.20E+03	4.40E+03		9.20E+02
				2.00E-02	I					1	0.1		1.36E+09		Propargite	2312-35-8					4.70E+03	1.70E+04		3.70E+03
				2.00E-03	I					1	0.1		1.36E+09		Propargyl Alcohol	107-19-7					4.70E+02	1.70E+03		3.70E+02
				2.00E-02	I					1	0.1		1.36E+09		Propazine	139-40-2					4.70E+03	1.70E+04		3.70E+03
				2.00E-02	I					1	0.1		1.36E+09		Propham	122-42-9					4.70E+03	1.70E+04		3.70E+03
				1.30E-02	I					1	0.1		1.36E+09		Propiconazole	60207-90-1					3.10E+03	1.10E+04		2.40E+03
						8.00E-03	I	V		1		3.26E+04	1.36E+09	8.94E+03	Propionaldehyde	123-38-6							2.20E+02	2.20E+02
				1.00E-01	X	1.00E+00	X	V		1	0.1	2.64E+02	1.36E+09	6.99E+03	Propyl benzene	103-65-1					2.30E+04	8.70E+04	2.20E+04	1.00E+04
						3.00E+00	C	V		1	0.1	3.49E+02	1.36E+09	7.04E+02	Propylene	115-07-1							6.60E+03	6.60E+03
				2.00E+01	P					1	0.1		1.36E+09		Propylene Glycol	57-55-6					4.70E+06	1.70E+07		3.70E+06
						2.70E-04	A			1	0.1		1.36E+09		Propylene Glycol Dinitrate	6423-43-4							1.20E+06	1.20E+06
				7.00E-01	H					1	0.1		1.36E+09		Propylene Glycol Monoethyl Ether	1569-02-4					1.60E+05	6.10E+05		1.30E+05
				7.00E-01	H	2.00E+00	I			1	0.1		1.36E+09		Propylene Glycol Monomethyl Ether	107-98-2					1.60E+05	6.10E+05	8.50E+09	1.30E+05
2.40E-01	I	3.70E-06	I			3.00E-02	I	V		1		7.77E+04	1.36E+09	1.03E+04	Propylene Oxide	75-56-9	2.90E+02		7.80E+02	2.10E+02			9.70E+02	9.70E+02
				2.50E-01	I					1	0.1		1.36E+09		Pursuit	81335-77-5					5.90E+04	2.20E+05		4.60E+04
				2.50E-02	I					1	0.1		1.36E+09		Pydrin	51630-58-1					5.90E+03	2.20E+04		4.60E+03
				1.00E-03	I			V		1		5.30E+05	1.36E+09	5.54E+04	Pyridine	110-86-1					2.30E+02			2.30E+02
				5.00E-04	I					1	0.1		1.36E+09		Quinalphos	13593-03-8					1.20E+02	4.40E+02		9.20E+01
3.00E+00	I									1	0.1		1.36E+09		Quinoline	91-22-5	2.30E+01	7.60E+01		1.80E+01				
						3.00E-02	A			1			1.36E+09		Refractory Ceramic Fibers	NA							1.30E+08	1.30E+08
				3.00E-02	I					1	0.1		1.36E+09		Resmethrin	10453-86-8					7.00E+03	2.60E+04		5.50E+03
				5.00E-02	H					1	0.1		1.36E+09		Ronnel	299-84-3					1.20E+04	4.40E+04		9.20E+03
				4.00E-03	I					1	0.1		1.36E+09		Rotenone	83-79-4					9.40E+02	3.50E+03		7.40E+02
2.20E-01	C	6.30E-05	C						M	1	0.1		1.36E+09		Safrole	94-59-7	7.00E+01	2.40E+02	2.20E+06	5.40E+01				
				2.50E-02	I					1	0.1		1.36E+09		Savey	78587-05-0					5.90E+03	2.20E+04		4.60E+03

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #27); H = HEAST; J = New Jersey; O = EPA Office of Water; F = See FAQ; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information														Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
				5.00E-03	I					1			1.36E+09		Selenious Acid	7783-00-8					1.20E+03			1.20E+03
				5.00E-03	I	2.00E-02	C			1			1.36E+09		Selenium	7782-49-2					1.20E+03		8.50E+07	1.20E+03
				5.00E-03	C	2.00E-02	C			1			1.36E+09		Selenium Sulfide	7446-34-6					1.20E+03		8.50E+07	1.20E+03
				9.00E-02	I					1	0.1		1.36E+09		Sethoxydim	74051-80-2					2.10E+04	7.90E+04		1.70E+04
						3.00E-03	C			1			1.36E+09		Silica (crystalline, respirable)	7631-86-9							1.30E+07	1.30E+07
				5.00E-03	I					0.04			1.36E+09		Silver	7440-22-4					1.20E+03			1.20E+03
1.20E-01	H			5.00E-03	I					1	0.1		1.36E+09		Simazine	122-34-9	5.80E+02	1.90E+03		4.40E+02	1.20E+03	4.40E+03		9.20E+02
				1.30E-02	I					1	0.1		1.36E+09		Sodium Acifluorfen	62476-59-9					3.10E+03	1.10E+04		2.40E+03
				4.00E-03	I					1			1.36E+09		Sodium Azide	26628-22-8					9.40E+02			9.40E+02
5.00E-01	C	1.50E-01	C	2.00E-02	C	2.00E-04	C		M	0.025			1.36E+09		Sodium Dichromate	10588-01-9	3.10E+01		9.20E+02	3.00E+01	4.70E+03		8.50E+05	4.70E+03
2.70E-01	H			3.00E-02	I					1	0.1		1.36E+09		Sodium Diethyldithiocarbamate	148-18-5	2.60E+02	8.40E+02		2.00E+02	7.00E+03	2.60E+04		5.50E+03
				5.00E-02	A	1.30E-02	C			1			1.36E+09		Sodium Fluoride	7681-49-4					1.20E+04		5.50E+07	1.20E+04
				2.00E-05	I					1	0.1		1.36E+09		Sodium Fluoroacetate	62-74-8					4.70E+00	1.70E+01		3.70E+00
				1.00E-03	H					1			1.36E+09		Sodium Metavanadate	13718-26-8					2.30E+02			2.30E+02
2.40E-02	H			3.00E-02	I					1	0.1		1.36E+09		Stirofos (Tetrachlorovinphos)	961-11-5	2.90E+03	9.50E+03		2.20E+03	7.00E+03	2.60E+04		5.50E+03
5.00E-01	C	1.50E-01	C	2.00E-02	C	2.00E-04	C		M	0.025			1.36E+09		Strontium Chromate	7789-06-2	3.10E+01		9.20E+02	3.00E+01	4.70E+03		8.50E+05	4.70E+03
				6.00E-01	I					1			1.36E+09		Strontium, Stable	7440-24-6					1.40E+05			1.40E+05
				3.00E-04	I					1	0.1		1.36E+09		Strychnine	57-24-9					7.00E+01	2.60E+02		5.50E+01
				2.00E-01	I	1.00E+00	I	V		1		8.67E+02	1.36E+09	9.35E+03	Styrene	100-42-5					4.70E+04		2.90E+04	1.80E+04
				3.00E-03	P					1	0.1		1.36E+09		Styrene-Acrylonitrile (SAN) Trimer	NA					7.00E+02	2.60E+03		5.50E+02
				1.00E-03	P	2.00E-03	X			1	0.1		1.36E+09		Sulfolane	126-33-0					2.30E+02	8.70E+02	8.50E+06	1.80E+02
				8.00E-04	P					1	0.1		1.36E+09		Sulfonylbis(4-chlorobenzene), 1,1'-	80-07-9					1.90E+02	7.00E+02		1.50E+02
						1.00E-03	C			1			1.36E+09		Sulfur Trioxide	7446-11-9							4.30E+06	4.30E+06
						1.00E-03	C			1			1.36E+09		Sulfuric Acid	7664-93-9							4.30E+06	4.30E+06
				2.50E-02	I					1	0.1		1.36E+09		Systhane	88671-89-0					5.90E+03	2.20E+04		4.60E+03
				3.00E-02	H					1	0.1		1.36E+09		TCMTB	21564-17-0					7.00E+03	2.60E+04		5.50E+03
				7.00E-02	I					1	0.1		1.36E+09		Tebuthiuron	34014-18-1					1.60E+04	6.10E+04		1.30E+04
				2.00E-02	H					1	0.1		1.36E+09		Temephos	3383-96-8					4.70E+03	1.70E+04		3.70E+03
				1.30E-02	I					1	0.1		1.36E+09		Terbacil	5902-51-2					3.10E+03	1.10E+04		2.40E+03
				2.50E-05	H					1	0.1		1.36E+09		Terbufos	13071-79-9					5.90E+00	2.20E+01		4.60E+00
				1.00E-03	I					1	0.1		1.36E+09		Terbutryn	886-50-0					2.30E+02	8.70E+02		1.80E+02
				1.00E-04	I					1	0.1		1.36E+09		Tetrabromodiphenyl ether, 2,2',4,4'- (BDE-47)	5436-43-1					2.30E+01	8.70E+01		1.80E+01
				3.00E-04	I					1	0.1		1.36E+09		Tetrachlorobenzene, 1,2,4,5-	95-94-3					7.00E+01	2.60E+02		5.50E+01
2.60E-02	I	7.40E-06	I	3.00E-02	I			V		1		6.80E+02	1.36E+09	5.68E+03	Tetrachloroethane, 1,1,1,2-	630-20-6	2.70E+03		2.20E+02	2.00E+02	7.00E+03			7.00E+03
2.00E-01	I	5.80E-05	C	2.00E-02	I			V		1		1.90E+03	1.36E+09	1.51E+04	Tetrachloroethane, 1,1,2,2-	79-34-5	3.50E+02		7.30E+01	6.00E+01	4.70E+03			4.70E+03
2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	V		1		1.66E+02	1.36E+09	2.35E+03	Tetrachloroethylene	127-18-4	3.30E+04		2.50E+03	2.40E+03	1.40E+03		2.90E+02	2.40E+02
				3.00E-02	I					1	0.1		1.36E+09		Tetrachlorophenol, 2,3,4,6-	58-90-2					7.00E+03	2.60E+04		5.50E+03
2.00E+01	H									1	0.1		1.36E+09		Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	3.50E+00	1.10E+01		2.70E+00				
				5.00E-04	I					1	0.1		1.36E+09		Tetraethyl Dithiopyrophosphate	3689-24-5					1.20E+02	4.40E+02		9.20E+01
						8.00E+01	I	V		1		1.09E+03	1.36E+09	1.22E+03	Tetrafluoroethane, 1,1,1,2-	811-97-2							3.10E+05	3.10E+05
				2.00E-03	P					1	0.1		1.36E+09		Tetryl (Trinitrophenylmethylnitramine)	479-45-8					4.70E+02	1.70E+03		3.70E+02
				7.00E-06	X					1			1.36E+09		Thallium (I) Nitrate	10102-45-1					1.60E+00			1.60E+00
				1.00E-05	X					1			1.36E+09		Thallium (Soluble Salts)	7440-28-0					2.30E+00			2.30E+00
				6.00E-06	X					1			1.36E+09		Thallium Acetate	563-68-8					1.40E+00			1.40E+00
				2.00E-05	X					1			1.36E+09		Thallium Carbonate	6533-73-9					4.70E+00			4.70E+00
				6.00E-06	X					1			1.36E+09		Thallium Chloride	7791-12-0					1.40E+00			1.40E+00
				2.00E-05	X					1			1.36E+09		Thallium Sulfate	7446-18-6					4.70E+00			4.70E+00
				1.00E-02	I					1	0.1		1.36E+09		Thiobencarb	28249-77-6					2.30E+03	8.70E+03		1.80E+03
				7.00E-02	X					1	0.008		1.36E+09		Thiodiglycol	111-48-8					1.60E+04	8.10E+05		1.60E+04
				3.00E-04	H					1	0.1		1.36E+09		Thiofanox	39196-18-4					7.00E+01	2.60E+02		5.50E+01
				8.00E-02	I					1	0.1		1.36E+09		Thiophanate, Methyl	23564-05-8					1.90E+04	7.00E+04		1.50E+04
				5.00E-03	I					1	0.1		1.36E+09		Thiram	137-26-8					1.20E+03	4.40E+03		9.20E+02
				6.00E-01	H					1			1.36E+09		Tin	7440-31-5					1.40E+05			1.40E+05
						1.00E-04	A			1			1.36E+09		Titanium Tetrachloride	7550-45-0							4.30E+05	4.30E+05
				8.00E-02	I	5.00E+00	I	V		1		8.18E+02	1.36E+09	4.29E+03	Toluene	108-88-3					1.90E+04		6.70E+04	1.50E+04
1.80E-01	X			2.00E-04	X					1	0.1		1.36E+09		Toluene-2,5-diamine	95-70-5	3.90E+02	1.30E+03		3.00E+02	4.70E+01	1.70E+02		3.70E+01
3.00E-02	P			4.00E-03	X					1	0.1		1.36E+09		Toluidine, p-	106-49-0	2.30E+03	7.60E+03		1.80E+03	9.40E+02	3.50E+03		7.40E+02
1.10E+00	I	3.20E-04	I							1	0.1		1.36E+09		Toxaphene	8001-35-2	6.30E+01	2.10E+02	1.20E+06	4.80E+01				
				7.50E-03	I					1	0.1		1.36E+09		Tralomethrin	66841-25-6					1.80E+03	6.50E+03		1.40E+03
				3.00E-04	A					1	0.1		1.36E+09		Tri-n-butyltin	688-73-3					7.00E+01	2.60E+02		5.50E+01
				8.00E+01	X					1	0.1		1.36E+09		Triacetin	102-76-1					1.90E+07	7.00E+07		1.50E+07
				1.30E-02	I					1	0.1		1.36E+09		Triallate	2303-17-5					3.10E+03	1.10E+04		2.40E+03
				1.00E-02	I					1	0.1		1.36E+09		Triasulfuron	82097-50-5					2.30E+03	8.70E+03		1.80E+03
				5.00E-03	I					1	0.1		1.36E+09		Tribromobenzene, 1,2,4-	615-54-3					1.20E+03	4.40E+03		9.20E+02
9.00E-03	P			1.00E-02	P					1	0.1		1.36E+09		Tributyl Phosphate	126-73-8	7.70E+03	2.50E+04		5.90E+03	2.30E+03	8.70E+03		1.80E+03
				3.00E-04	P					1	0.1		1.36E+09		Tributyltin Compounds	NA					7.00E+01	2.60E+02		5.50E+01
				3.00E-04	I					1	0.1		1.36E+09		Tributyltin Oxide	56-35-9					7.00E+01	2.60E+02		5.50E+01
				3.00E+01	I	3.00E+01	H	V		1		9.10E+02	1.36E+09	1.29E+03	Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1					7.00E+06		1.20E+05	1.20E+05
7.00E-02	I			2.00E-02	I					1	0.1		1.36E+09		Trichloroacetic Acid	76-03-9	9.90E+02	3.30E+03		7.60E+02	4.70E+03	1.70E+04		3.70E+03
2.90E-02	H									1	0.1		1.36E+09		Trichloroaniline HCl, 2,4,6-	33663-50-2	2.40E+03	7.80E+03		1.80E+03				
7.00E-03	X			3.00E-05	X					1	0.1		1.36E+09		Trichloroaniline, 2,4,6-	634-93-5	9.90E+03	3.30E+04		7.60E+03	7.00E+00	2.60E+01		5.50E+00
				8.00E-04	X			V		1	0.1		1.36E+09	3.22E+04	Trichlorobenzene, 1,2,3-	87-61-6					1.90E+02	7.00E+02		1.50E+02
2.90E-02	P			1.00E-02	I	2.00E-03	P	V		1		4.04E+02	1.36E+09	2.99E+04	Trichlorobenzene, 1,2,4-	120-82-1	2.40E+03			2.40E+03	2.30E+03		1.90E+02	1.70E+02
				2.00E+00	I	5.00E+00	I	V		1		6.40E+02	1.36E+09	1.65E+03	Trichloroethane, 1,1,1-	71-55-6					4.70E+05		2.60E+04	2.40E+04
5.70E-02	I	1.60E-05	I	4.00E-03	I	2.00E-04	X	V		1		2.16E+03	1.36E+09	7.22E+03	Trichloroethane, 1,1,2-	79-00-5	1.20E+03		1.30E+02	1.10E+02	9.40E+02		4.50E+00	4.50E+00

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #27); H = HEAST; J = New Jersey; O = EPA Office of Water; F = See FAQ; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information														Contaminant		Carcinogenic Target Risk (TR) = 1E-06				Noncancer Child Hazard Index (HI) = 3			
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	PEF (m^3/kg)	VF (m^3/kg)	Analyte	CAS No.	Ingestion SL TR=1.0E-4 (mg/kg)	Dermal SL TR=1.0E-4 (mg/kg)	Inhalation SL TR=1.0E-4 (mg/kg)	Carcinogenic SL TR=1.0E-4 (mg/kg)	Ingestion SL Child HQ=3 (mg/kg)	Dermal SL Child HQ=3 (mg/kg)	Inhalation SL Child HQ=3 (mg/kg)	Noncarcinogenic SL Child HI=3 (mg/kg)
4.60E-02	I	4.10E-06	I	5.00E-04	I	2.00E-03	I	V	M	1		6.92E+02	1.36E+09	2.21E+03	Trichloroethylene	79-01-6	8.80E+02		1.10E+02	9.40E+01	1.20E+02		1.40E+01	1.20E+01
				3.00E-01	I	7.00E-01	H	V		1		1.23E+03	1.36E+09	1.04E+03	Trichlorofluoromethane	75-69-4					7.00E+04		2.30E+03	2.20E+03
				1.00E-01	I					1	0.1		1.36E+09		Trichlorophenol, 2,4,5-	95-95-4					2.30E+04	8.70E+04		1.80E+04
1.10E-02	I	3.10E-06	I	1.00E-03	P					1	0.1		1.36E+09		Trichlorophenol, 2,4,6-	88-06-2	6.30E+03	2.10E+04	1.20E+08	4.80E+03	2.30E+02	8.70E+02		1.80E+02
				1.00E-02	I					1	0.1		1.36E+09		Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5					2.30E+03	8.70E+03		1.80E+03
				8.00E-03	I					1	0.1		1.36E+09		Trichlorophenoxypropionic acid, -2,4,5	93-72-1					1.90E+03	7.00E+03		1.50E+03
				5.00E-03	I			V		1		1.28E+03	1.36E+09	1.50E+04	Trichloropropane, 1,1,2-	598-77-6					1.20E+03			1.20E+03
3.00E+01	I			4.00E-03	I	3.00E-04	I	V	M	1		1.40E+03	1.36E+09	1.57E+04	Trichloropropane, 1,2,3-	96-18-4	5.10E-01			5.10E-01	9.40E+02		1.50E+01	1.50E+01
				3.00E-03	X	3.00E-04	P	V		1		4.51E+02	1.36E+09	2.34E+03	Trichloropropene, 1,2,3-	96-19-5					7.00E+02		2.20E+00	2.20E+00
				2.00E-02	A					1	0.1		1.36E+09		Tricresyl Phosphate (TCP)	1330-78-5					4.70E+03	1.70E+04		3.70E+03
				3.00E-03	I					1	0.1		1.36E+09		Tridiphane	58138-08-2					7.00E+02	2.60E+03		5.50E+02
						7.00E-03	I	V		1		2.79E+04	1.36E+09	1.58E+04	Triethylamine	121-44-8							3.50E+02	3.50E+02
				2.00E+00	P					1	0.1		1.36E+09		Triethylene Glycol	112-27-6					4.70E+05	1.70E+06		3.70E+05
7.70E-03	I			7.50E-03	I					1	0.1		1.36E+09		Trifluralin	1582-09-8	9.00E+03	3.00E+04		6.90E+03	1.80E+03	6.50E+03		1.40E+03
2.00E-02	P			1.00E-02	P					1	0.1		1.36E+09		Trimethyl Phosphate	512-56-1	3.50E+03	1.10E+04		2.70E+03	2.30E+03	8.70E+03		1.80E+03
						5.00E-03	P	V		1		2.93E+02	1.36E+09	9.44E+03	Trimethylbenzene, 1,2,3-	526-73-8							1.50E+02	1.50E+02
						7.00E-03	P	V		1		2.19E+02	1.36E+09	7.91E+03	Trimethylbenzene, 1,2,4-	95-63-6							1.70E+02	1.70E+02
				1.00E-02	X			V		1		1.82E+02	1.36E+09	6.61E+03	Trimethylbenzene, 1,3,5-	108-67-8					2.30E+03			2.30E+03
				3.00E-02	I					1	0.019		1.36E+09		Trinitrobenzene, 1,3,5-	99-35-4					7.00E+03	1.40E+05		6.70E+03
3.00E-02	I			5.00E-04	I					1	0.032		1.36E+09		Trinitrotoluene, 2,4,6-	118-96-7	2.30E+03	2.40E+04		2.10E+03	1.20E+02	1.40E+03		1.10E+02
				2.00E-02	P					1	0.1		1.36E+09		Triphenylphosphine Oxide	791-28-6					4.70E+03	1.70E+04		3.70E+03
				2.00E-02	A					1	0.1		1.36E+09		Tris(1,3-Dichloro-2-propyl) Phosphate	13674-87-8					4.70E+03	1.70E+04		3.70E+03
				1.00E-02	X					1	0.1		1.36E+09		Tris(1-chloro-2-propyl)phosphate	13674-84-5					2.30E+03	8.70E+03		1.80E+03
2.00E-02	P			7.00E-03	P					1	0.1		1.36E+09		Tris(2-chloroethyl)phosphate	115-96-8	3.50E+03	1.10E+04		2.70E+03	1.60E+03	6.10E+03		1.30E+03
3.20E-03	P			1.00E-01	P					1	0.1		1.36E+09		Tris(2-ethylhexyl)phosphate	78-42-2	2.20E+04	7.10E+04		1.70E+04	2.30E+04	8.70E+04		1.80E+04
				3.00E-03	I	4.00E-05	A			1			1.36E+09		Uranium (Soluble Salts)	NA					7.00E+02		1.70E+05	7.00E+02
1.00E+00	C	2.90E-04	C						M	1	0.1		1.36E+09		Urethane	51-79-6	1.50E+01	5.40E+01	4.80E+05	1.20E+01				
		8.30E-03	P	9.00E-03	I	7.00E-06	P			0.026			1.36E+09		Vanadium Pentoxide	1314-62-1			4.60E+04	4.60E+04	2.10E+03		3.00E+04	2.00E+03
				5.00E-03	S	1.00E-04	A			0.026			1.36E+09		Vanadium and Compounds	7440-62-2					1.20E+03		4.30E+05	1.20E+03
				1.00E-03	I					1	0.1		1.36E+09		Vernolate	1929-77-7					2.30E+02	8.70E+02		1.80E+02
				2.50E-02	I					1	0.1		1.36E+09		Vinclozolin	50471-44-8					5.90E+03	2.20E+04		4.60E+03
				1.00E+00	H	2.00E-01	I	V		1		2.75E+03	1.36E+09	4.40E+03	Vinyl Acetate	108-05-4					2.30E+05		2.80E+03	2.70E+03
		3.20E-05	H			3.00E-03	I	V		1		3.37E+03	1.36E+09	1.37E+03	Vinyl Bromide	593-60-2			1.20E+01	1.20E+01			1.30E+01	1.30E+01
7.20E-01	I	4.40E-06	I	3.00E-03	I	1.00E-01	I	V	M	1		3.92E+03	1.36E+09	9.56E+02	Vinyl Chloride	75-01-4	9.40E+00		1.60E+01	5.90E+00	7.00E+02		3.00E+02	2.10E+02
				3.00E-04	I					1	0.1		1.36E+09		Warfarin	81-81-2					7.00E+01	2.60E+02		5.50E+01
				2.00E-01	S	1.00E-01	S	V		1		3.90E+02	1.36E+09	5.58E+03	Xylene, P-	106-42-3					4.70E+04		1.70E+03	1.70E+03
				2.00E-01	S	1.00E-01	S	V		1		3.88E+02	1.36E+09	5.47E+03	Xylene, m-	108-38-3					4.70E+04		1.70E+03	1.70E+03
				2.00E-01	S	1.00E-01	S	V		1		4.34E+02	1.36E+09	6.46E+03	Xylene, o-	95-47-6					4.70E+04		2.00E+03	1.90E+03
				2.00E-01	I	1.00E-01	I	V		1		2.58E+02	1.36E+09	5.82E+03	Xylenes	1330-20-7					4.70E+04		1.80E+03	1.80E+03
				3.00E-04	I					1			1.36E+09		Zinc Phosphide	1314-84-7					7.00E+01			7.00E+01
				3.00E-01	I					1			1.36E+09		Zinc and Compounds	7440-66-6					7.00E+04			7.00E+04
				5.00E-02	I					1	0.1		1.36E+09		Zineb	12122-67-7					1.20E+04	4.40E+04		9.20E+03
				8.00E-05	X					1			1.36E+09		Zirconium	7440-67-7					1.90E+01			1.90E+01